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CORRESPONDENCE WITH THE NUCLEAR REGULATORY COMMISSION AND THE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

PREPARED BY

THE SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT

OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

OF THE

U.S. HOUSE OF REPRESENTATIVES

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U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

November 15, 1976

The Honorable
James A. Haley, Chairman
Committee on Interior and
Insular Affairs
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

I am transmitting herewith a compilation of correspondence between the Subcommittee and the Nuclear Regulatory Commission, and between the Subcommittee and the Energy Research and Development Administration during 1976. This correspondence results from the Subcommittee's exercise of its nuclear oversight function. The letters have been retyped in some cases where the file copies were not suitable for reproduction.

I believe the information contained herein provides valuable insights into some of the major nuclear issues which confront us.

Sincerely,

Mo Udall

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

November 23, 1976

Members of the Committee on Interior
and Insular Affairs
U.S. House of Representatives
Washington, D.C. 20515

Dear Colleagues:

In exercise of its nuclear oversight function, the Subcommittee on Energy and the Environment during 1976 has corresponded with the Nuclear Regulatory Commission and with the Energy Research and Development Administration on a series of nuclear issues.

This correspondence contains information on a range of matters which are of concern to all Members. I am forwarding it to you in the belief that it will be useful reference material.

Sincerely,

James A. Haley

JAMES A. HALEY
Chairman

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1976 SUBCOMMITTEE CORRESPONDENCE WITH THE NUCLEAR REGULATORY COMMISSION

I. Nuclear Material Accounting Problems at Erwin, Tennessee

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

January 9, 1976

Mr. William Anders
Chairman, Nuclear Regulatory Commission
1717 M Street, N.W.
Washington, D.C.

Dear Chairman Anders:

The January 8, 1976 Washington Star reports a substantial discrepancy in accounting for "bomb-grade" uranium at the Nuclear Fuel Services Facility in Erwin, Tennessee. This incident raises several questions relevant to the concerns of the Subcommittee on Energy and the Environment.

I would appreciate your providing an explanation of what went wrong. What assurance is there, in the presence of this apparently unreliable accounting system, that materials have not been illicitly removed from the plant? Does this incident carry any implication regarding the overall usefullness of material control and accounting systems? What accuracy can be expected from material control and accounting systems in large reprocessing and fabrication plants which would be associated with large scale plutonium recycle?

I look forward to receiving your reply.

With best regards,

Sincerely,

Morris K. Udall
Chairman, Subcommittee on
Energy and the Environment

enclosure

OFFICE OF THE CHAIRMAN

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAR 19 1976

Honorable Morris K. Udall
Chairman, Subcommittee on Energy
 and the Environment
Committee on Interior and Insular Affairs
U. S. House of Representatives

Dear ~~Chairman~~ Mo Udall:

I apologize for the delay in responding to your January 9, 1976, inquiry regarding the uranium inventory discrepancy at the Nuclear Fuel Services plant (NFS) in Erwin, Tennessee. However, the Nuclear Regulatory Commission staff was engaged in an urgent review of the NFS situation and I felt the Commission could better respond to your concerns after the review. The enclosures contain a summary of events at the NFS plant and staff comments to your specific questions.

I hope this information is fully responsive to your needs.

Sincerely,

William A. Anders
Chairman

Enclosures:
1. Summary Report on Erwin incident
2. Response to Chairman Udall's
 Specific Questions

NUCLEAR FUEL SERVICES, INC.
ERWIN, TENNESSEE
INVENTORY DISCREPANCY

Nuclear Fuel Services, Inc. (NFS), Erwin, Tennessee, is licensed by the Nuclear Regulatory Commission (NRC) to process highly enriched uranium.

At the Erwin facility there are production activities (conducted in Plant 6) and scrap recovery activities (conducted in Plant 5). Both plants are within the fenced facility boundary. The plants are about 100 yards apart. Scrap--in the form of waste--generated in the production activities of Plant 6 is transferred to Plant 5 for chemical recovery of the enriched uranium. Accountable values for the two plants are based on common measurements of transferred material. Recovered uranium is returned as feed material to the production activities within Plant 6. NFS also is authorized to process at Plant 5 scrap produced at locations other than Plant 6.

As a part of a safeguards program, NFS is required by NRC to conduct an inventory on a bimonthly basis of the highly enriched special nuclear material in its possession. On December 1, 1975, NFS informed the NRC that inventory discrepancies existed at Plants 5 and 6. These discrepancies were identified during a physical inventory initiated on October 27, 1975. During this inventory period, Plant 5 recovered scrap only from Plant 6. The net discrepancy of the two individual plant balances showed more material was present than indicated by accountability book values.

A reinventory of both plants was initiated. Feed inputs to Plant 6 was discontinued on December 1, 1975. Plant 5 operation continued so that the scrap on-hand could be processed to more amenable measurement form.

Representatives of the NRC's Office of Inspection and Enforcement (I&E), by periodic onsite visits, observed the reinventory operations, reviewed reinventory schedules, verified inventory listings, and took independent samples for chemical analysis.

On December 19, the NRC permitted the Plant 6 to resume operations with the provision that no scrap was to be transferred to Plant 5. The results of the reinventories showed that the net discrepancy of the two individual plant balances continued to show more material present than indicated by the accountability book values. Representatives of the NRC office in Atlanta conducted a review and audit of the inventory process. A detailed inspection of plant security was also performed.

From January 13 through 15, a NRC task group visited the facility to review this matter. The task group identified measures in the safeguards program where strengthening should be promptly initiated as well as areas for longer-term improvement in the safeguards program. NRC onsite inspection on January 26 confirmed that NFS had implemented the short-term measures to strengthen the safeguards program. On January 26, NFS resumed operation in Plant 5 with the continuing provision that it process only scrap from Plant 6.

On February 20, in response to broadcase allegations about intentional wrongdoing in connection with the inventory discrepancies at the NFS Erwin facility a special NRC investigation team was dispatched to the site by chartered aircraft. While the team uncovered no information to support allegations of intentional wrongdoing, the investigative material developed as a result of this inquiry will be turned over to the FBI. Following FBI review and evaluation of the investigative material a report of the NRC investigation will be released to the public by the NRC.

RESPONSE TO SPECIFIC QUESTIONS

Question 1: What went wrong at NFS?

Answer: Several problems were identified in the NFS accounting and record-keeping system. In one facility there was an apparent shortage of uranium. In a connecting plant there was an apparent excess. The sum of the two discrepancies was a plus. The differences between "book" inventory and actual material on hand was discovered in a routine physical inventory. NRC was notified and the plant was shut down for reinventory in order to determine what happened. NRC appointed a special task group to visit the plant to determine what led to the accounting discrepancies. The task group reported that the discrepancies were caused in part by a bias in the measurement of dissolver solution in the licensee's scrap recovery plant and in part by the licensee's overstatement of the quantity of uranium contained in liquid discards. The measurement bias occurred when undissolved scrap residue was transferred to the accountability weigh tank. This caused a pipe blockage in the tank, improper mixing of the weigh tank solution, and the removal and analysis of accountability samples which were not representative of the concentration of uranium actually present. The overstatement of uranium in liquid discards resulted from the licensee's practice of recording "less than" measurement determinations as quantities of uranium actually discarded. As an example, if the licensee determined that the amount of uranium in the discarded material was less than 0.005 grams per liter, the quantity of the recorded discard would be based on the maximum value (i.e. 0.005 grams per liter). The recorded amount would be greater than the amount of material actually discarded.

Corrective actions have been implemented by NFS. Improved methods are now employed to assure against the transfer of undissolved residues to the accountability weigh tank and to continually check to assure against another pipe blockage. Also, NFS is making more sensitive measurements of liquid discards and is now recording only the quantities of uranium actually present. In addition to needed improvements in the accountability system, the task group identified other areas in the safeguards program where prompt upgrading was necessary. One of the needed improvements related to the company's practice of relying on the honor system to check for concealed special nuclear material on individuals departing from material access areas. The company was directed to

cease this practice and to employ a watchman continuously at each authorized exit and entry point to assure that searching is properly carried out. Needed upgrading has been accomplished.

Question 2: What assurance is there, in the presence of this apparently unreliable accounting system, that materials have not been illicitly removed from the plant?

Answer: The NRC task group investigation did not find any information that would indicate that special nuclear materials have been illicitly removed from the plant.

Question 3: Does this incident carry any implication regarding the overall usefulness of material control and accounting systems?

Answer: Yes, these systems needed to be improved. The inventory anomalies at NFS also evidence that we cannot depend exclusively on accounting systems to control nuclear material. This is the reason that the NRC is placing increased emphasis on physical security and overall aspects of material control. Such measures include personnel access control and containment procedures such as tamper proofing of sensitive vaults, exit searches and portal sensors. The investigation at the Erwin plant identified several areas where prompt improvements should be accomplished, and these improvements have been made.

Question 4: What accuracy can be expected from material control and accounting systems in large reprocessing and fabrication plants which would be associated with large scale plutonium recycle?

Answer: Under NRC regulations, accuracy of an operator's accounting system must be reliable down to 0.5% of throughput quantities for fuel production operations. For reprocessing plants, the control limit is 1% for plutonium and 0.7% for uranium. While improvements can be made in the future and will be required (including a more timely accounting system), sole reliance would not be placed on bookkeeping to detect diversion. Accordingly, as noted above, NRC would insist that an in-depth security system be utilized to monitor, prevent, detect, or defeat any attempt to illicitly remove nuclear materials from licensed plants. NRC also believes that "engineered redundancy" which is used so successfully in design of reactors for safety purposes, can also be effectively employed to protect against any such unauthorized diversion of materials.

II. Highly Enriched Uranium Exports

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

January 16, 1976

COPY

Mr. William Anders
Chairman, Nuclear Regulatory Commission
1717 M Street, N.W.
Washington, D.C.

Dear Chairman Anders:

The January 14 Washington Post carried an article by Thomas O'Toole concerning export of research reactor and HTGR fuel. The article suggests there might be significant advantages from the safeguards standpoint if we restricted exports of such fuels to uranium not enriched to the point where it could be used in a nuclear explosive. I would appreciate your views on the feasibility of such restrictions.

Since it comes as something of a surprise that such materials have been exported to the extent implied in the article, I would also be grateful if you would indicate the annual quantities which have been exported over the past decade, the size of each shipment involving more than five kilograms, where the material has gone, what it is used for, and to what extent the NRC keeps track of it once it has left the United States.

The Subcommittee on Energy and the Environment is considering holding hearings concerning what might be done to increase the difficulty of fabricating nuclear explosives. I would therefore also welcome your views on the practicality of various schemes proposed for blending plutonium and uranium oxides.

Sincerely,

Morris K. Udall
Chairman, Subcommittee on
Energy and the Environment

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAR 2 3 1976

OFFICE OF THE
CHAIRMAN

Honorable Morris K. Udall
Chairman, Subcommittee on
Energy and the Environment
Committee on Interior and Insular Affairs
U. S. House of Representatives

Dear Chairman Udall:

I am pleased to respond to your letter of January 16, 1976, concerning the export of research reactor and HTGR fuel and related questions. You requested the views of the Nuclear Regulatory Commission on the feasibility of restricting the export of such fuels to uranium not enriched to the point where it could be used in a nuclear explosive, and our views on the practicality of increasing the difficulty of fabricating nuclear explosives through the blending of plutonium and uranium oxides. Answers to these questions have been prepared by the NRC staff and will be found in Enclosure 1.

You also requested shipment and end-use information concerning the supply of highly enriched material abroad during the past decade. As was discussed with Henry Myers of your staff, we are faced with some practical problems in retrieving all of this information. Enclosed are two tables covering 1969 through 1975, one showing total exports by year and one showing exports of significant quantities of material by country of destination. End-use information is included only for 1974 and 1975. We will provide to you the additional shipment and end-use information as soon as we can.

I am hopeful that you will find this information useful and we hope to provide the additional information soon. Please let us know if we may be of further assistance.

Sincerely,

William A. Anders
Chairman

Enclosures:

1. Information concerning export of reactor material
2. Data on shipments of enriched uranium

INFORMATION CONCERNING EXPORT OF REACTOR MATERIAL

1. Please provide the NRC views from the Safeguards standpoint on the feasibility of restricting the export of uranium to an enrichment below the point where it could be used in a nuclear explosive.

Discussion:

It is noted, correctly, that there would be an advantage from the safeguards standpoint if exports of uranium were restricted to those fuels enriched to a point where they could not be used in a nuclear explosive. At the same time, some research and test reactors do require highly enriched uranium to operate.

Nuclear reactor facilities operated for purposes other than the generation of heat and/or electrical power are utilized for either of the following primary purposes:

(1) As a source of neutrons produced in the fission process, or

(2) As a device for education and training in nuclear fundamentals.

In general, facilities operating primarily for the first-named purpose require highly enriched uranium to obtain neutron fluxes as high as possible relative to the heat necessarily generated in the fission process. The ultimate objectives in operating such neutron producing "machines" may be pure scientific or applied research, product or process development, materials testing, production of radioactive materials for sale (e.g., for use in radio-pharmaceutical products), or for use as an analytical tool, as in neutron activation analysis. If highly enriched uranium were not available for use in certain of these facilities, their potential usefulness would be substantially decreased to the point where it would no longer be practical to use them for many applications.

For most other education and training purposes, a research reactor can be fueled with low enriched uranium. In fact, a substantial number of such facilities are in current use in the United States and around the world that utilize fuel enriched to less than 20 percent in U-235. However, the use of small quantities of highly enriched uranium in a research reactor, when operated at higher power levels, provides a much greater useful life-span and results in substantial savings in fuel costs.

It should also be mentioned that HTGR power reactors are presently designed to use uranium enriched to high concentrations, and could not be accommodated to use lower concentrations without substantial redesign. No HTGR reactors exist outside the United States and there are none on order; thus no export of fuel for this purpose is anticipated.

Enclosure 1

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However, the Federal Republic of Germany has fueled a THTR (Thorium High Temperature Reactor) with high enriched uranium supplied by the United States. Since the THTR involves the same fuel cycle principles as the HTGR, although with different reactor geometry, the same considerations would apply to it with regard to use of reduced levels of uranium enrichment.

Exports of plutonium and highly enriched uranium are reviewed on a case-by-case basis. An important part of this review entails an analysis of physical protection measures employed by recipient countries for the express purpose of assuring that they afford a degree of protection essentially equivalent to those employed in the United States. Recipients of U. S. supplied material are required by the terms of their Agreement for Cooperation with the United States to safeguard material in accordance with procedures acceptable to the U.S., which generally follow the IAEA procedures and recommendations.

2. Provide NRC views on the practicality of various schemes proposed for blending plutonium and uranium oxides to increase the difficulty of fabricating nuclear explosives.

Discussion:

The blending of plutonium and uranium oxides has been proposed by Dr. Karl Puechl and others as a means, if the Commission decides to permit the wide-scale use of recycled plutonium in mixed oxide fuel in light water reactors, of increasing the difficulty of obtaining plutonium in a concentration sufficient to allow fabrication of a nuclear explosive without further processing. The concept presents numerous issues, including optimal means of achieving such blending, the cost of the process, and the degree of difficulty a would-be terrorist would encounter in seeking to separate the plutonium from the mixture. The Commission has taken no position on the feasibility or practicality of blending as a safeguards measure, but careful staff study of the blending concept is presently underway in the context of the draft environmental statement now being prepared on the safeguards aspects of wide-scale use of mixed oxide fuel. That statement will also consider alternative safeguards means, evaluating costs and benefits systematically.

SHIPMENTS OF ENRICHED URANIUM

TABLE 1. ANNUAL ENRICHED URANIUM SHIPMENTS FOR PERIOD 1969 THROUGH 1975 - BY ENRICHMENT

TABLE 2. MAJOR SHIPMENTS OF URANIUM ENRICHED TO 20% OR GREATER (5 KGS AND ABOVE)

Enclosure 2

TABLE 1

ANNUAL ENRICHED URANIUM SHIPMENTS

FOR PERIOD 1969 THROUGH 1975 - BY ENRICHMENT

(ROUNDED TO NEAREST KILOGRAM)

	Total		0 - <20%		20 - <70%		70 - <90%		90% or Greater	
Calendar Year	U-**	U-235	U-**	U-235	U-**	U-235	U-**	U-235	U-**	U-235
1969	343,548	8,050	342,455	7,391	621	229	130	112	342	318
1970	323,820	8,625	322,771	7,857	340	118	44	35	665	615
1971	627,011	19,097	624,791	17,738	1,010	239	80	72	1,130	1,048
1972	648,824	16,992	647,941	16,199	66	40	192	172	625	581
1973	954,380	24,861	953,492	24,038	5	3	*	*	883	820
1974	812,687	21,809	811,134	20,587	320	74	2	1	1,231	1,147
1975	1,176,574	31,829	1,175,917	31,219	4	2	1	1	652	607

* Less than one kilogram

** Total Uranium column includes all isotopes of uranium.

TABLE 2
MAJOR SHIPMENTS OF

URANIUM ENRICHED TO 20% OR GREATER (5 KGS AND ABOVE)

SUMMARY 1/

	URANIUM		
Country and Year	No. of Shipments	Element (Kgs)	Isotope (Kgs)
Argentina			
1971	2	20.0	18.0
1973	1	10.6	9.6
TOTAL	3	30.6	27.6
Canada			
1970	1	11.0	10.2
1971	2	99.0	92.2
1972	2	66.9	62.3
1973	4	85.9	79.8
1974	2	10.0	9.3
1975	4	20.8	19.5
TOTAL	15	293.6	273.3
France			
1969	2	189.9	167.5
1970	8	483.1	374.7
1971	4	685.3	623.6
1972	7	159.3	126.6
1973	5	337.9	314.5
1974	3	128.6	119.8
1975	1	76.1	70.9
TOTAL	30	2060.2	1797.6
Germany			
1969	6	895.9	487.0
1970	7	410.3	253.8
1971	16	288.7	259.0
1972	8	384.7	351.8
1973	12	249.6	230.8
1974	8	418.4	390.1
1975	10	161.1	150.0
TOTAL	67	2808.7	2122.5

1/ This summary reflects shipments for each country, by year, of total uranium (element) and its U-235 (isotope) content for material enriched to 20% and above. Individual shipments are detailed on pages 5 through 10 of this Table.

URANIUM

Country and Year		No. of Shipments	Element (Kgs)	Isotope (Kgs)
Italy				
	1970	1	30.7	23.0/3.8
	TOTAL	1	30.7	23.0 U-235 3.8 U-233
Japan				
	1969	1	7.0	4.8
	1970	2	26.4	23.8
	1971	10	1083.0	326.7
	1972	1	25.4	23.6
	1973	6	74.6	69.5
	1974	1	317.7	73.4
	1975	1	16.4	15.3
	TOTAL	22	1550.5	537.1
South Africa				
	1975	1	5.0	4.6
	TOTAL	1	5.0	4.6
United Kingdom				
	1970	2	82.0	76.3
	1971	1	9.4	8.5
	1972	5	227.5	212.0
	1973	2	108.7	101.3
	1974	2	647.5	603.2
	1975	1	326.0	303.7
	TOTAL	13	1401.1	1305.0
GRAND TOTAL		152	8180.4	6090.7

INDIVIDUAL MAJOR SHIPMENTS OF ENRICHED URANIUM (5 KGS OR OVER)
ENRICHED TO 20% OR MORE IN THE ISOTOPE 235

COUNTRY OF DESTINATION	DATE OF SHIPMENT	MATERIAL U KGS	MATERIAL U-235 KGS	USE
ARGENTINA				
	9-15-71	13.3	12.0	
	11-10-71	6.7	6.0	
	7-06-73	10.6	9.6	
TOTAL		30.6	27.6	
CANADA				
	8-06-70	11.0	10.2	
	1-06-71	65.0	60.5	
	7-17-71	34.0	31.7	
	5-10-72	60.0	55.9	
	7-31-72	6.9	6.4	
	3-07-73	32.0	29.7	
	8-06-73	27.0	25.1	
	9-04-73	21.0	19.5	
	8-07-73	5.9	5.5	
	7-25-74	5.0	4.7	WR-1
	5-31-74	5.0	4.6	NRX-NRU Reactors
	11-13-75	5.0	4.6	
	12-08-75	5.2	4.9	AECL Research Reactors
	12-10-75	5.3	5.0	NRX - NRU
	12-15-75	5.3	5.0	
TOTAL		293.6	273.3	

COUNTRY OF DESTINATION	DATE OF SHIPMENT	MATERIAL U KGS	MATERIAL U-235 KGS	USE
FRANCE				
	6-29-69	130.1	111.8	
	7-22-69	59.8	55.7	
	3-31-70	120.0	111.7	
	5-07-70	125.0	116.4	
	5-07-70	10.0	9.8	
	5-07-70	44.6	13.5	
	5-22-70	75.4	22.6	
	10-20-70	14.8	13.8	
	12-10-70	73.0	68.0	
	12-10-70	20.3	18.9	
	2-08-71	232.0	216.1	
	2-19-71	213.0	198.4	
	4-30-71	30.0	13.2	
	12-30-71	210.3	195.9	
	4-14-72	11.3	10.5	
	4-14-72	8.5	7.9	
	5-16-72	9.3	8.7	
	6-13-72	5.1	4.7	
	1-06-72	30.0	28.0	
	2-07-72	30.5	28.4	
	4-13-72	64.6	38.4	
	1-08-73	42.0	39.1	
	4-23-73	84.1	78.2	
	11-05-73	44.9	41.8	
	11-28-73	67.0	62.4	
	12-27-73	99.9	93.0	
	11-06-74	59.1	55.0	Research Reactors and laboratory purposes at the following Centers:
	11-06-74	34.4	32.1	
	11-06-74	35.1	32.7	
	1-28-75	76.1	70.9	
TOTAL		2060.2	1797.6	

For:

Grenoble Center

SILOE, SILOETTE, RHF

Marcoule

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PEGASE, CABRI, HARMONIE, RAPSODIE, MAZURKA

COUNTRY OF DESTINATION	DATE OF SHIPMENT	MATERIAL U KGS	MATERIAL U-235 KGS	USE
FRANCE (cont'd)				
				Bremillis Center
				EL-4
				Bollene
				SEFC
GERMANY	4-17-69	60.0	55.8	
	6-09-69	141.9	49.7	
	11-04-69	157.2	70.7	
	11-04-69	15.9	14.8	
	11-04-69	315.0	104.3	
	11-19-69	205.9	191.7	
	4-13-70	32.0	29.8	
	4-20-70	220.4	81.4	
	7-20-70	25.9	23.4	
	7-20-70	15.0	14.0	
	12-09-70	55.5	49.9	
	12-31-70	55.5	49.9	
	12-28-70	6.0	5.4	
	1-15-71	15.0	14.0	
	2-01-71	44.1	41.1	
	3-15-71	11.0	9.9	
	3-15-71	11.5	10.3	
	3-22-71	17.5	15.8	
	3-29-71	15.0	14.0	
	3-31-71	22.0	19.8	
	4-19-71	6.0	1.2	
	6-09-71	16.5	15.4	
	8-02-71	15.0	14.0	
	8-02-71	50.1	45.1	
	8-02-71	11.1	10.0	
	9-13-71	30.0	26.9	
	9-13-71	6.9	6.2	
	10-04-71	10.2	9.2	
	10-20-71	6.8	6.1	
	5-26-72	166.6	149.9	
	5-31-72	48.0	44.7	
	6-13-72	6.0	5.4	
	8-22-72	48.0	44.7	
	10-31-72	17.5	15.8	
	11-20-72	48.0	44.7	
	12-11-72	15.6	14.0	
	3-01-72	35.0	32.6	
	1-03-73	8.4	7.5	
	2-27-73	15.4	14.4	
	2-20-73	11.5	10.3	
	2-12-73	17.3	16.1	
	2-21-73	16.3	15.2	

COUNTRY OF DESTINATION	DATE OF SHIPMENT	MATERIAL U KGS	MATERIAL U-235 KGS	USE
GERMANY (Cont'd)				
	2-14-73	16.3	15.2	
	4-23-73	48.1	44.8	
	5-07-73	20.0	18.7	
	5-07-73	10.4	9.4	
	6-25-73	10.7	10.0	
	6-25-73	27.2	24.5	
	7-17-73	48.0	44.7	
	2-28-74	96.0	89.5	THTR REACTOR
	6-13-74	29.6	27.6	(1) GKSS; (2) Working Stock at KWU; (3) Working Stock at NUKEM for AVR Reloads
	6-13-74	63.9	59.6	THTR REACTOR
	10-29-74	85.7	79.9	Fabrication for Dragon Project in U.K.; R-2 in Sweden; DR-3 in Denmark; JAERI Materials & Test Reactor in Japan; Bruce-3 in Canada
	10-29-74	15.9	14.9	Fabrication for BR-2 in Belgium; HFR in Netherlands; THTR Working Stock
	12-17-74	97.7	91.0	Same as above
	12-17-74	16.0	14.9	THTR
	10-29-74	13.6	12.7	Fabrication for UK Civil Research Program
	12-03-75	16.1	15.0	Fabrication for KFA in Germany; and HFR-PETTEN in Netherlands
	12-03-75	16.4	15.2	
	12-03-75	16.6	15.5	
	7-08-75	15.7	14.6	AVR In Germany
	7-08-75	14.2	13.2	
	7-08-75	15.2	14.1	
	8-05-75	16.7	15.6	Fabrication for HFR, Grenoble, France; R-2, Sweden; HFR, Netherlands; Bruce-4, Canada; DELFT, Netherlands
	8-05-75	16.8	15.6	
	10-15-75	16.7	15.6	
	10-15-75	16.7	15.6	
TOTAL		2808.7	2122.5	

COUNTRY OF DESTINATION	DATE OF SHIPMENT	MATERIAL U KGS	MATERIAL U-235 KGS	USE
ITALY	10-28-70	30.7	23.0	U-235 Irradiated fuel sent
			3.8	U-233 to Italy for recovery
TOTAL		30.7	23.0/3.8	
JAPAN	6-15-69	7.0	4.8	
	10-28-70	13.3	12.0	
	9-08-70	13.1	11.8	
	8-25-71	681.2	156.7	
	8-27-71	291.2	67.3	
	1-21-71	30.0	28.0	
	8-09-71	17.7	16.5	
	8-09-71	19.0	17.7	
	8-09-71	7.5	6.8	
	8-09-71	7.0	6.3	
	8-09-71	15.7	14.6	
	8-17-71	7.3	6.8	
	12-15-71	6.4	6.0	
	12-12-72	25.4	23.6	
	5-03-73	15.0	14.0	
	5-09-73	17.0	15.8	
	11-09-73	7.4	6.9	
	11-26-73	14.3	13.3	
	11-26-73	6.0	5.6	
	11-26-73	14.9	13.9	
	3-01-74	317.7	73.4	JOYO Fuel
	1-07-75	16.4	15.3	Fabrication for UK Civil Research Reactors
TOTAL		1550.5	537.1	
SOUTH AFRICA	6-13-75	5.0	4.6	SAFARI I
TOTAL		5.0	4.6	
U. K.	11-09-70	67.8	63.1	
	12-21-70	14.2	13.2	
	3-29-71	9.4	8.5	
	4-26-72	53.9	50.2	
	7-26-72	66.1	61.6	
	7-26-72	10.0	9.3	
	1-05-72	87.1	81.2	
	1-05-72	10.4	9.7	
	5-29-73	90.0	83.8	
	5-29-73	18.7	17.5	

COUNTRY OF DESTINATION	DATE OF SHIPMENT	MATERIAL U KGS	MATERIAL U-235 KGS	USE
U. K. (cont'd)				
	2-27-74	321.8	299.8	U.S.-U.K. Joint
	11-18-74	325.7	303.4	Military Program
	11-20-75	326.0	303.7	(Classified)
TOTAL		1401.1	1305.0	
TOTAL - ALL SHIPMENTS		8180.4	6090.7	
			3.8 U-233	

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

November 12, 1976

<u>COPY</u>

The Honorable
Marcus Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Marc:

On January 16, 1976, I requested Chairman Anders to provide information concerning export of highly enriched uranium. While this request was fulfilled partially in a letter dated March 23, certain of the requested data was not provided. In particular, as you noted, the list specifying the end use of the highly enriched uranium was incomplete. In addition, there was no indication of the extent to which the NRC keeps track of the materials once it leaves the United States.

I would appreciate your undertaking to insure that the remaining information is provided expeditiously.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

III. NRC Procedures to Encourage Expression of Diverse Views by Commission Staff

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

January 22, 1976

COPY

Mr. William Anders
Chairman, Nuclear Regulatory Commission
1717 H Street, N.W.
Washington, D.C. 20555

Dear Mr. Anders:

A recent press release (76-12) notes the Commission's interest in insuring adequate opportunity for staff members to communicate their views to top management. I wholeheartedly support such a policy.

Public confidence in the regulatory process is a necessary concomitant to a viable nuclear energy program in the United States. To achieve such confidence requires that diverse viewpoints are represented on the NRC staff and that channels exist through which disparate views may be heard.

The Subcommittee on Energy and the Environment is considering holding hearings concerning the contention of some public interest groups that the public interest is not sufficiently taken into account in the Commission's decision making. I would appreciate, therefore, your informing the Subcommittee with regard to the manner by which the Commission is assured that diverse perspectives are well represented on the staff and with regard to procedures which encourage expression of views by low and mid-level staff.

Sincerely,

Morris K. Udall
Chairman, Subcommittee on
Energy and the Environment

OFFICE OF THE
CHAIRMAN

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAR 19 1976

Honorable Morris K. Udall
Chairman, Subcommittee on
Energy and the Environment
Committee on Interior and
Insular Affairs
U. S. House of Representatives

Dear Chairman Udall:

This is in response to your letter of January 22, 1976, in which you request information with regard to (1) the manner by which the Commission is assured that diverse perspectives are represented in the staff, and (2) the procedures which encourage expressions of views by low and mid-level staff.

With respect to (1) above, when the Director of the Office of Nuclear Reactor Regulation (NRR) was appointed 10 months ago, the Commission made it clear that his first responsibility was public safety, and that a concurrent responsibility was openness in the exercise of the licensing process - openness to the range of views represented within the staff and openness to the views of applicants and the public. I assure you that these responsibilities have been carried out by the Director of NRR.

The NRC organizational structure and the safety review process also assure that diverse perspectives are represented on the staff. The in-depth technical review is carried out by technical specialists from more than 20 branches (see Enclosure 1 for examples of interfacing of review specialists). These specialists focus on particular portions of the plant or provide expert analyses in a particular technical discipline. The broader focus is provided by technical members of a few other branches, who take an overall look at nuclear plant safety, and by a project manager in a separate organization through which the technical review efforts on a particular plant are coordinated (see Enclosure 2 for an outline of the safety review process).

The technical review is conducted in several stages with broad peer review and selective management review. First, the reviewer discusses novel features with others in his technical group, evaluates the extensive technical information presented by the utility, and then

formulates questions on areas that are not clear or with which he has technical disagreements. These questions are routinely reviewed by the two immediate levels of supervision and by the project manager before being transmitted to the utility. It is at this stage that the potential for differences of opinions between staff members may arise. Should a proposed question not be endorsed by either of the technical reviewer's supervisors, the issue would be discussed with the reviewer. If agreement were not reached, or if the question raised a new issue, the matter would also be discussed with the appropriate Assistant Director.

Frequent meetings are held within the technical review sections and branches to assure that all personnel working in a particular technical area are aware of the technical concerns of other reviewers. This provides a method of factoring these concerns into their own review, with the goal of pursuing these issues to approximately the same technical depth on all plants currently under review. This is another way in which differing technical views may become evident and resolved. Any dissenting views are discussed with supervision, typically to at least the level of the Assistant Director for the particular organizational unit.

In a similar manner, meetings are held by technical reviewers between branches when an area is identified which is outside the direct responsibility of the initiating branch, or a problem is raised which affects the technical responsibility of more than one branch.

When novel safety questions arise that are not amenable to a conventional solution, the normal procedure is to allow the reviewer to ask exploratory questions of the utilities to obtain additional technical information on which a decision can be based. In some cases, where the information sources seem contradictory or where detailed information is not available a task force may be formed from the various disciplines involved and charged with writing a summary technical paper on the problem. Individuals with previously expressed interest in a particular technical topic are usually assigned to such groups.

The task force consideration and the management review of the task force work is also another potential area for differences of opinion to arise. These may be resolved by discussion, or may continue to exist with an agreeable interim solution decided on while additional information is obtained.

The above described technical review procedures provide a mechanism for assuring that diverse perspectives are represented in arriving at technical judgments on major safety issues.

79-679 O - 76 - 3

Should dissatisfaction with the outcome of a particular decision still exist, the opportunity exists for an individual to carry his disagreements to higher levels of management.

With respect to (2) above, the following is a listing of prior and ongoing efforts to encourage expressions of views by low and mid-level staff:

-- On December 21, 1971, the Director of Regulation, Atomic Energy Commission, sent a memorandum to "All Employees, Regulation" containing the following language -

"Since the people who do the work in our organization are in the best position to identify any changes that may be desirable to improve the efficiency of their particular operation, I want to encourage each staff member to assist us in this endeavor. I will welcome your sending directly to me any constructive suggestions for improvements in procedures, organization or other areas with which you are concerned. A form is attached to indicate some of the areas that might be considered, but this is in no way intended to restrict the scope of suggestions."

-- On February 11, 1972, the Director of Regulation, Atomic Energy Commission, sent a memorandum to "All Employees, Regulation" commenting on a Commission Order dated February 4, 1972, directing the regulatory staff to make available, with very limited exceptions, internal staff documents bearing on its consideration of ECCS criteria. The Director's memorandum contained in part the following -

"While the Commission's Order was limited specifically to the ECCS hearing and was not intended to serve as a precedent, it is important that this Order not be interpreted in a manner which could adversely affect the free exchange of views within the AEC.

All of us are fully aware of the basic and fundamental responsibilities placed on the regulatory staff in the protection of the public health and safety and the environment. The fact that internal documents may be made public must not be allowed in any way to undermine the thoroughness and conscientiousness with which we carry out these responsibilities.

While the natural instinct may be to polish reports and memoranda we must primarily devote our time and effort to reaching sound and supportable decisions and conclusions. Reports and memoranda, conscientiously prepared in a professional manner, are not only helpful to our ongoing internal functions and deliberations, but will, if made public, contribute to public confidence in our operations.

We must be on guard against any tendency to discount critical issues merely because documents may be made public. The public has a strong and legitimate interest in the safety of nuclear facilities and in environmental effects associated with these facilities. The fact that many of the issues involved are complex and highly technical must not be a bar to the public's need for relevant information concerning these issues.

It is important that in formulation of policy that the public release of internal documents does not become an inhibiting factor in a meaningful exploration of the issues."

-- On March 20, 1974, the Assistant Director for Reactor Safety issued a "Designation of Signature Authority" which authorized "Reactor Safety Personnel" to write memoranda to file or to any addressee "as the writer so desires" in non-routine policy and position issues.

-- Revision 5, May 1, 1975, of the Project Managers (PM) Handbook contains the following language at page 1-21 -

"A PM must identify differences in viewpoint, and either resolve them himself, in concert with his counterparts in the NRR organization or request management resolution as appropriate. The great majority of items in contention are resolved by the PM through discussions with appropriate staff. The highly technical environment and the many faceted technical specialities place an unusual demand on the PM for exerting overall technical leadership through judgment, rationale and persuasion rather than by unilateral direction or authoritarian command."

-- On June 19, 1975, the Director, Office of Nuclear Reactor Regulation (NRR), Nuclear Regulatory Commission, in a speech to all NRR employees said in part that -

"This Commission has set the sails of NRC in a new direction. Chairman Anders and other Commissioners have established as major thrusts in our new effort:

Effectiveness
Openness
Efficiency"

He concluded his remarks by saying:

"that I am pleased to be associated with each of you in this important effort. I hope that you will help me find opportunities to get to know

you each personally. Stop by to see me -- my door is open. Stop me in the hall or on the street. I look forward to these next years with confidence because of your demonstrated competence."

-- On February 10, 1976, I sent a memorandum to the Executive Director for Operations, which was distributed to all NRC employees, clearly re-emphasizes the policy of this agency to encourage free and open communication and a means whereby it can be accomplished (see Enclosure 3 for copy).

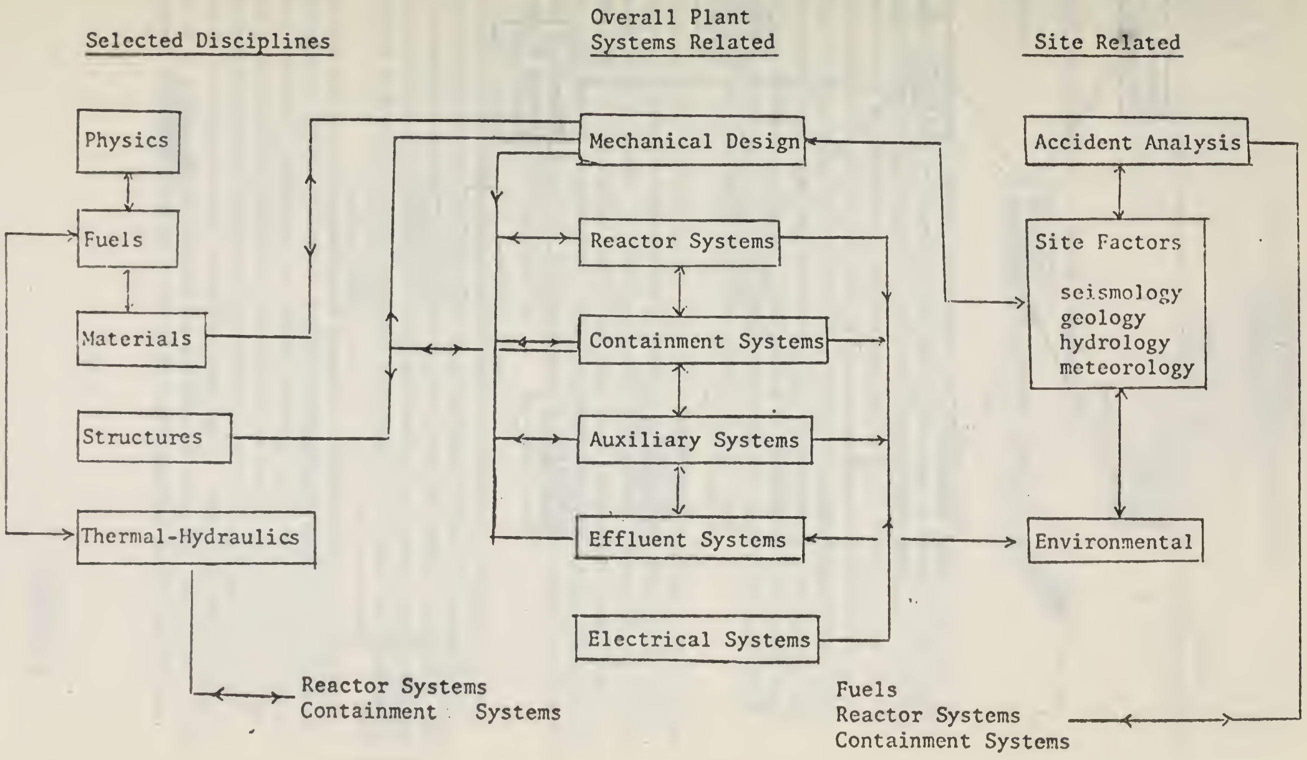
I am hopeful that you will find this information useful. Please let us know if we may be of further assistance.

Sincerely,

William A. Anders
Chairman

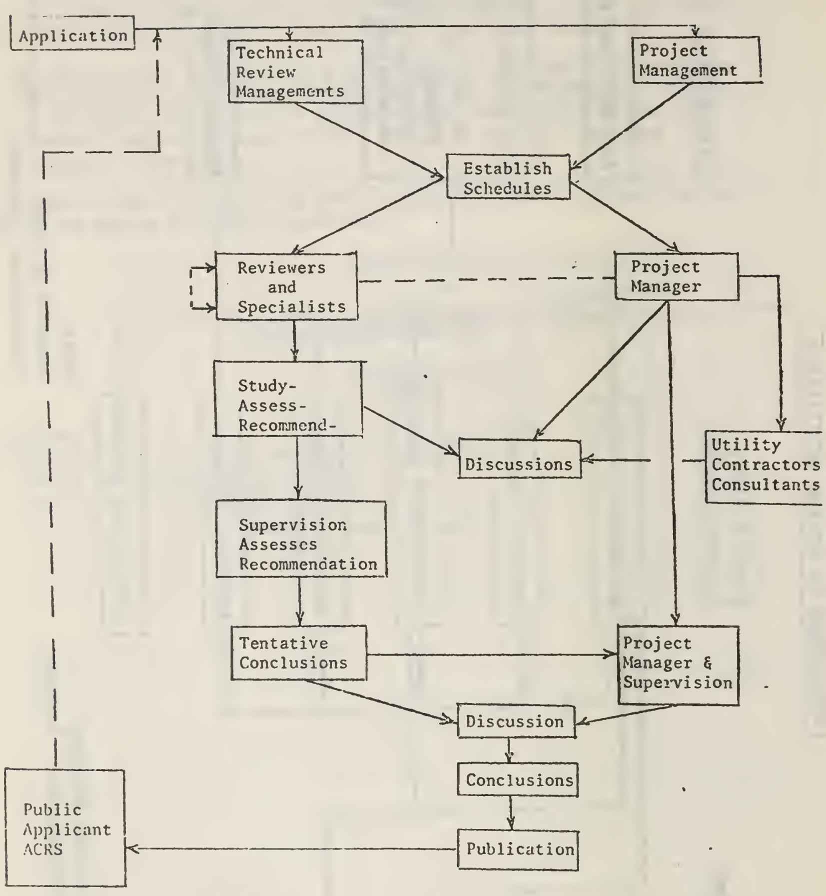
Enclosures:
1. Examples of interfacing of review specialists
2. Outline of safety review process
3. Memo fm Anders to EDO dtd 2/10/76

EXAMPLES OF
INTERFACING OF REVIEW SPECIALISTS



ENCLOSURE 1

OUTLINE OF SAFETY
REVIEW PROCESS



ENCLOSURE 2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

FEB 10 1976

OFFICE OF THE
CHAIRMAN

MEMORANDUM FOR: Lee V. Gossick, EDO

FROM: William A. Anders, Chairman

The free flow of internal information and viewpoints is the foundation of sound regulation. I want to take this opportunity on behalf of the whole Commission to reemphasize to you and through you to the entire staff the importance of a free flow of information and views. The doors of the Commissioners' offices are always open to employees who believe that they have no other channels in which to express these views effectively. If any NRC employee has information he wishes to convey to me, he has only to seek an appointment, and he may be assured that his confidence will be protected. All of the Commissioners have reaffirmed to me that this has been and continues to be their policy as well.

Each employee should also be made aware that the Commission intends the Office of Inspector and Auditor to provide a similar opportunity for communication of views. As the Commission has several times stated, we view this office in substantial part as serving in an independent watchdog capacity for the Commission. It follows that Commission employees should feel free to take concerns they may have to OIA without risk of adverse action against them for having done so.

Finally I should like you and all the office directors to reemphasize your own commitment to free and open communication within the Commission. This ought to include not only the regular chain by which most issues will be presented and resolved, but regular meetings or other occasions with staff at all levels at which employee concerns of every sort can be aired.

As you well know, none of these measures reflects change in course or practice for the Commission. Recent developments, including allegations that dissenting employees are unable to bring their views to the attention of top management within the Commission, however, have suggested the appropriateness of reaffirming our commitment to a regulatory process which is open internally as well as externally. Please take the necessary steps to convey these views to the attention of every NRC employee. This should include providing a copy of this memorandum to each employee.

ENCLOSURE 3

IV. Commission Procedures

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

February 3, 1976

COPY

Mr. William Anders, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Anders:

A pervasive belief among persons interested in nuclear matters is that important decisions are made without sufficient public understanding of their bases. As I have indicated before, I believe the nuclear industry cannot be viable unless there is widespread confidence in the regulatory process. One means of achieving confidence is to ensure a detailed public record of the Commission's transactions.

To this end I am interested in records of the Commission's deliberations. In particular I would appreciate your indicating for the year 1975 the number of meetings held by the Commission, the number of votes taken by the Commission, the breakdown of votes according to the general nature of the subject matter (i.e. adjudicatory, rule making or broad policy making, and administrative), a breakdown of votes among commissioners on specific matters, and the extent to which minutes are kept of discussions so that there might be awareness of the considerations which have influenced the various decisions.

Thank you for your assistance.

Sincerely,

Morris K. Udall
Chairman, Subcommittee on
Energy and the Environment

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE CHAIRMAN

MAR 19 1976

Honorable Morris K. Udall
Chairman, Subcommittee on
Energy and the Environment
Committee on Interior and
Insular Affairs
U. S. House of Representatives

Dear Chairman Udall:

This is in response to your letter of February 3, 1976, in which you requested statistical data and other information pertaining to Commission meetings conducted in Calendar Year 1975.

Enclosed is a summary prepared by the Office of the Secretary which addresses the specific points mentioned in your letter.

Your general observation that the nuclear industry cannot be viable unless there is a widespread confidence in the regulatory process is shared completely by my fellow Commissioners and me. In its first year of operation NRC has made a sincere attempt to insure public understanding of the Commission's business:

During 1975 Atomic Safety and Licensing Boards held a total of 423 days of public hearings at 65 locations throughout the country in an effort to assure full public participation in the licensing process for nuclear facilities. In the same period Atomic Safety and Licensing Appeal Boards held public hearings on 21 days at four different locations.

In addition, NRC has instituted an extensive program for obtaining public comments for all phases of its regulatory proceedings and has sought peer review on a number of issues, including those reports mandated by the Energy Reorganization Act of 1974. Our efforts included:

- Publication in 1975 of 95 Federal Register Notices requesting public comment on a variety of issues;

- Two public meetings on GESMO;

- Oral Argument before the Commission on the Catawba facility;

- Sixteen workshops and seminars at five locations during the development of the Nuclear Energy Center Site Survey study;

- Solicitation of public comment on the scope of work for the Security Agency Study, and individual comments are being requested on the study itself;

- A public hearing to be held this week on the participation of intervenors in NRC export licensing proceedings;

- Approximately 400 meetings, open to participation by interested intervenors, between the Nuclear Reactor Regulation staff and applicants for NRC licenses;

- A four day NRC/American National Standards Institute-sponsored meeting, noticed in the Federal Register and open to the public, on priorities in writing nuclear standards.

NRC has also taken many steps to explain its role and its actions to the public. In 1975 these included:

- Distribution of records to 135 public document rooms located throughout the country for the convenience of the public and containing the documents which pertain to licensing of nuclear plants in the immediate vicinity;

- More than 200 public appearances by the Commission and NRC staff before nuclear and non-nuclear groups;

- More than 300 public announcements explaining portions of our regulatory process, inviting attention to Commission actions and generally providing for public awareness of important issues under consideration;

- More than 100 meetings conducted by the Advisory Committee on Reactor Safeguards at 28 locations throughout the country at which the public was afforded the opportunity to participate in discussions of nuclear plant safety issues.

We believe that these and other efforts by NRC demonstrate an earnest desire on our part to assure a comprehensive public record of the Commission's activities and to fulfill the pledge which I made to the Congress to disclose fully the bases for all Commission decisions.

Sincerely,

William A. Anders
Chairman

Enclosure:
As stated

RESPONSES TO SPECIFIC QUESTIONS RAISED BY CONGRESSMAN UDALL WITH REGARD TO

MEETING STATISTICS

OFFICE OF THE SECRETARY

U.S. NUCLEAR REGULATORY COMMISSION

For the year 1975:

Q. ... "the number of meetings held by the Commission"...

A. Policy Sessions: 68

Adjudicatory Policy Sessions: 27

Briefings: 78

TOTAL 173

Q. ... "The Number of votes taken by the Commission, the breakdown of votes according to the general nature of the subject matter (i.e. adjudicatory, rule making or broad policy making, and administrative)," ...

A. Rule Making 21

Licensing 8

Adjudicatory 43

Administrative 28

Broad Policy 9

Other 8

TOTAL 117

Q. . . . "a breakdown of votes among commissioners on specific matters" . . .

A. All votes were unanimous votes of the Commissioners present and qualified to vote, with the exception of three cases of dissenting votes:

1. Commissioner Gilinsky on February 6, 1975, dissented in part to proposed NRC Licensing Legislation allowing the Commission to issue interim operating licenses before the completion of operating license hearings.

2. Chairman Anders dissented in the Matter of Alabama Power Company, September 5, 1975, on procedural aspects without expressing an opinion the merits of the case.

3. Commissioner Gilinsky dissented on November 7, 1975, with regard to a classified item.

Q. . . . "The extent to which minutes are kept of discussions" . . .

A. Summary longhand notes are taken at Policy Sessions, Adjudicatory Policy Sessions and most briefings. These notes are later drafted into a "Record of Decision"-type minute.

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

March 25, 1976

COPY

Mr. William A. Anders, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Anders:

This is in regard to your letter of March 19 in which you responded to my request of February 3 for information concerning the record of Commission transactions. I am in complete agreement with you concerning the necessity to fulfill the commitment you made, ". . . to the Congress to disclose fully the bases for all Commission decisions."

In order for the Energy and Environment Subcommittee to carry out its oversight functions, it is necessary that we possess a more complete understanding of considerations which enter into the Commission's decision making. I would appreciate, therefore, your providing minutes (excluding classified or proprietary information) of discussions concerning matters which were the subject of the 117 votes taken by the Commission in calendar year 1975.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE
CHAIRMAN

June 25, 1976

Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and Insular Affairs
U. S. House of Representatives

Dear Mr. Chairman:

This is in response to your letter of March 25, 1976, to Chairman Anders, requesting any minutes of discussions of the Commission on matters which were the subject of Commission votes in 1975.

The Commission has decided, as a matter of general policy, to make available to the public the Record-of-Decision type minutes that were identified in the Office of the Secretary's summary enclosed with Chairman Anders' letter to you of March 19, 1976. Henceforth, these documents will be placed in the Commission's Public Document Room after deletion of certain categories of information which are described below. Consistent with this policy, we have enclosed for your use the documents for the calendar year 1975 and have marked, for your convenience, matters which were the subject of Commission votes. We have attached to these documents a list of attendees for each meeting.

These documents are the only Commission-approved record of Commission actions. They are memoranda from the Secretary of the Commission to the NRC staff and contain an identification of the matter considered by the Commission and a short statement of the action which the Commission took. Of course, on any given matter, the Commission action could include final disposition of the matter, with or without revisions, or referral of the matter to the Commission's staff with instructions.

In providing copies of its Record-of-Decision memoranda, the following categories of information have been deleted to preserve appropriate confidentiality:

(1) classified and proprietary information;

(2) predecisional adjudicatory, rulemaking, and policy-making information;

(3) information relating to positions on proposed legislation and pending litigation; and

(4) information relating to matters internal to the Nuclear Regulatory Commission such as those involving selection of or security clearances for personnel.

Copies of the memoranda are also being provided to the Joint Committee on Atomic Energy, in accordance with our obligation under the Atomic Energy Act, and are being placed in the Commission's Public Document Room. We would be happy to brief members of the Committee's staff in more detail on any aspect of this matter.

We wish to reassure you that the Nuclear Regulatory Commission is fully cognizant of the Subcommittee's oversight functions in the area of nuclear energy as commented upon in your March 25 letter and your subsequent letter of April 15 to former Chairman Anders. Please be assured that the Commission is, as Chairman Anders stated in his April 2 letter to you, wholly committed to a policy of openness in the regulatory process and in all aspects of its nuclear safety responsibilities.

Sincerely,

Marcus A. Rowden

Marcus A. Rowden
Chairman

Enclosures:
As stated

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Representative Record of Decision Documents Follow

(Complete Set is Available at NRC Public Document Room)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE SECRETARY

April 3, 1975

Approved ________ RMZ

Date ________

Raymond M. Zimmet, Acting Solicitor

SUBJECT: WORKING DRAFT OF ACTION ITEMS OF ADJUDICATORY POLICY SESSION 75-8, 8:35 A.M., THURSDAY, APRIL 3, 1975, COMMISSIONERS' CONFERENCE ROOM, D. C. OFFICE

SECY:KA

1. SECY-A-75-19 (and Talking Paper) - Selection of Contractor to Perform Study Concerning Funding of Intervenors

   Approved. (SOL)

   The proposed press release is to be circulated to the Commissioners for comment. (PA)

2. SECY-A-75-21 - Extension of Time for Commission Review of ALAB-262 (Limerick Units 1 & 2)

   Approved. (SOL/SECY)

   Commissioner Rowden did not participate in the decision or discussion of this item.

3. Report on Bailly Litigation

   The Commission requested:

   a. circulation of the Court of Appeals decision, and

   b. /Litigation information deleted.)

Original Signed by
John C. Hoyle

John C. Hoyle
Assistant Secretary of the Commission

cc:
Chairman Anders
Commissioner Rowden
Commissioner Mason
Commissioner Gilinsky
Commissioner Kennedy

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MINUTES OF

ADJUDICATORY SESSION 75-8

8:35 a.m., Thursday, April 3, 1975, Commisioners' Conference Room
D. C. Office

Commissioners

William A. Anders, Chairman
Marcus A. Rowden
Edward A. Mason
Richard T. Kennedy

Solicitor

Raymond M. Zimmet, Acting

Exec Dir for Operations

Lee V. Gossick

Secretary of the Commission

John C. Hoyle, Assistant

Staff

K. Anderson
E. Case
P. Crane
G. Cunningham
J. Furse
E. Halman
J. Hard
C. Heltemes
B. Huberman
J. Kelley
R. Kneip
R. McOsker
N. Terrell

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE SECRETARY

April 28, 1975

Approved ____________
RMZ
Date ____________

Raymond M. Zimmet, Acting Solicitor

SUBJECT: WORKING DRAFT OF ACTION ITEMS OF ADJUDICATORY POLICY SESSION 75-13, 3:10 P.M., APRIL 28, 1975, COMMISSIONERS' CONFERENCE ROOM, D. C. OFFICE

SECY:KA

1. SECY-A-75-28 - As Low As Practicable

Approved, subject to the inclusion of the rationale requested by Commissioner Rowden and review with individual Commissioners. Appropriate staff and the JCAE will be given advance notification. (SOL)

The Commission requested the ALAP press release be revised. (PA)

2. SECY-A-75-30 - Extension of Time for Commission Review of ALAB-264

The Commission affirmed its earlier approval (by Consent) of the Order extending the time for review. (SOL)

Commissioner Rowden did not participate in this item.

3. SECY-A-75-26 - Appointment of John M. Frysiak, Esq., as a Replacement for John B. Farmakides, Esq., as Chairman of an Atomic Safety & Licensing Board

The Commission affirmed its earlier approval (by Consent) of the appointment of Mr. Frysiak. (AS&LBP)

Original Signed by
John C. Hoyle

John C. Hoyle, Assistant
Secretary of the Commission

cc:
Chairman Anders
Commissioner Rowden
Commissioner Mason
Commissioner Gilinsky
Commissioner Kennedy

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MINUTES OF

ADJUDICATORY POLICY SESSION 75-13

3:10 p.m., Monday, April 28, 1975, Commissioners' Conference Room
D. C. Office

Commissioners

William A. Anders, Chairman
Marcus A. Rowden
Victor Gilinsky
Richard T. Kennedy

General Counsel

Peter L. Strauss

Secretary of the Commission

John C. Hoyle, Assistant

Staff

K. Anderson
P. Crane
G. Cunningham
J. Fouchard
J. Furse
J. Harris
C. Heltemes
B. Huberman
R. McOsker
L. Weiss

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

APPROVED ______________
LVG

DATE ______________

April 3, 1975

Lee V. Gossick, Executive Director
for Operations

SUBJECT: WORKING DRAFT OF ACTION ITEMS OF POLICY SESSION 75-14, 9:25 A.M., THURSDAY, APRIL 3, 1975, COMMISSIONERS' CONFERENCE ROOM, D. C. OFFICE

SECY:KA

1. Incident at Kewannee Plant

Noted.

2. Proposed Press Release of Broadened Review of Plants Following Browns Ferry Fire

Approved as revised. (PA)

The press release and bulletin are to be released concurrently. (PA)

3. Proposed Reply to March 24, 1975 Letter from Representative Scheuer and Proposed Letter to the JCAE Regarding Air Transport of Plutonium

Approved as revised. (EDO)

The Commission agreed that a rulemaking proceeding should be initiated on regulations regarding the transportation of significant quantities of Special Nuclear Material by air. A paper discussing the scope of such a proceeding and criteria for handling individual cases in the interim should be circulated for consideration at the Policy Session and scheduled for Thursday, April 10. (ELD/NMSS)

The Commission also noted the desirability of scheduling the following additional items for the April 10 Policy Session:

a. status of actions being taken as a result of the discussions on March 22, 1975; and

b. GESMO Issues (Commissioners' comments on the draft paper should be given to staff by Monday, April 7). (EDO/SECY)

4. <u>SECY-75-110 - Report to the Joint Committee on Atomic Energy on Operations Under the Indemnity Program</u>

Affirmed. (NMSS)

Original Signed by
John C. Hoyle

John C. Hoyle
Assistant Secretary of the Commission

cc:
Chairman Anders
Commissioner Rowden
Commissioner Mason
Commissioner Gilinsky
Commissioner Kennedy

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE SECRETARY

APPROVED ______________
LVG

DATE ______________

May 12, 1975

Lee V. Gossick, Executive Director
for Operations

SUBJECT: WORKING DRAFT OF ACTION ITEMS OF POLICY SESSION 75-24, 1:50 P.M., WEDNESDAY, MAY 7, 1975, COMMISSIONERS' CONFERENCE ROOM, BETHESDA, MARYLAND

SECY:KA

1. <u>Summary of IAEA Meeting Regarding the Gray Book</u>

The Commission noted that staff will circulate the draft revised Gray Book to the Commission. (SG)

Additionally, the Commission noted that a working paper will be coming up to the Commission in advance of the forthcoming IAEA Meeting to revise the IAEA report on Material Control and Accountability. The meeting is scheduled to be in Prague this July. (SG)

2. <u>French Sabotage Incident</u>

Noted.

3. <u>Security Programs at Nuclear Power Plant Sites Under Construction</u>

/Predecisional information deleted./

4. <u>Emergency Action Coordinating Team (EACT)</u>

The Commission requested a briefing prior to the finalization of EACT procedures. (IE)

5. <u>Additional Building Space</u>

Noted.

6. <u>Congressional Fellowship Nominations</u>

Approved. (EDO)

7. <u>INEL Computer Facility</u>

The Chairman signed the letters to OMB and ERDA. (SECY)

8. <u>Procedures for Informing the Commission of NRC Speakers and Visitors</u>

This office will work with Mr. Dircks, the Assistant Executive Director for Operations. (EDO/SECY)

Original Signed by
John C. Hoyle

John C. Hoyle, Assistant
Secretary of the Commission

cc:
Chairman Anders
Commissioner Rowden
Commissioner Mason
Commissioner Gilinsky
Commissioner Kennedy

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE SECRETARY

August 20, 1975

Approved ______________ LVG
Date ______________

Lee V. Gossick, Executive Director
for Operations

SUBJECT: WORKING DRAFT OF ACTION ITEMS OF POLICY SESSION 75-45, 11:05 A.M. & 2:15 P.M., THURSDAY, AUGUST 14, 1975, COMMISSIONERS' CONFERENCE ROOM, D. C. OFFICE

SECY:KA

1. Meeting with ERDA

/Information on internal matter deleted./

2. Browns Ferry

/Information on internal matter deleted./

3. SECY-75-434 - Notices of Systems of Records Under the Privacy Act - Proposed Routine Uses

Approved in principle; but the Commission put the item on a Consent Calendar (due the following day) to allow for individual Commissioner suggestions and comments. (ELD/ADM)

Additionally, the Office of EDO was requested to examine redundant records systems. (EDO)

4. SECY-A-75-76 - ECCS Exemption Request for Dresden 1

Approved. (OGC)

5. SECY-75-383 - Protection of Foreign Information Given in Confidence

Approved; subject to:

a. /Predecisional information deleted./

b. /_Predecisional information deleted_/

Original Signed by
Samuel J. Chilk
Samuel J. Chilk
Secretary of the Commission

cc:
Chairman Anders
Commissioner Rowden
Commissioner Mason
Commissioner Gilinsky
Commissioner Kennedy

V. Sabotage of Spent Fuel

NINETY-FOURTH CONGRESS

JAMES A. HALEY, FLA., CHAIRMAN

ROY A. TAYLOR, N.C.
HAROLD T. JOHNSON, CALIF.
MORRIS K. UDALL, ARIZ.
PHILLIP BURTON, CALIF.
ROBERT W. KASTENMEIER, WIS.
PATSY T. MINK, HAWAII
LLOYD MEEDS, WASH.
ABRAHAM KAZEN, JR., TEX.
ROBERT G. STEPHENS, JR., GA.
JOSEPH P. VIGORITO, PA.
JOHN MELCHER, MONT.
TENO RONCALIO, WYO.
JONATHAN B. BINGHAM, N.Y.
JOHN F. SEIBERLING, OHIO
HAROLD RUNNELS, N. MEX.
ANTONIO BORJA WON PAT, GUAM
RON DE LUGO, V.I.
BOB ECKHARDT, TEX.
GOODLOE E. BYRON, MD.
JAIME BENITEZ, P.R.
JIM SANTINI, NEV.
PAUL E. TSONGAS, MASS.
ALLAN T. HOWE, UTAH
JAMES WEAVER, OREG.
BOB CARR, MICH.
GEORGE MILLER, CALIF.
THEODORE M. (TED) RISENHOOVER, OKLA.
JAMES J. FLORIO, N.J.

JOE SKUBITZ, KANS.
SAM STEIGER, ARIZ.
DON H. CLAUSEN, CALIF.
PHILIP E. RUPPE, MICH.
MANUEL LUJAN, JR., N. MEX.
KEITH G. SEBELIUS, KANS.
ALAN STEELMAN, TEX.
DON YOUNG, ALASKA
ROBERT E. BAUMAN, MD.
STEVEN D. SYMMS, IDAHO
JAMES P. (JIM) JOHNSON, COLO.
ROBERT J. LAGOMARSINO, CALIF.
VIRGINIA SMITH, NEBR.
SHIRLEY N. PETTIS, CALIF.

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

CHARLES CONKLIN
STAFF DIRECTOR

LEE MC ELVAIN
GENERAL COUNSEL

MICHAEL C. MARDEN
MINORITY COUNSEL

February 17, 1976

COPY

Mr. William Anders, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Anders:

Recently the Subcommittee on Energy and the Environment has received correspondence indicating concern with regard to sabotage of shipments of spent fuel. The assertion is made that conventional explosives could readily be used to cause the release from shipping casks of substantial quantities of radioactive materials.

I would appreciate your informing the Subcommittee as to the extent to which the Commission believes such sabotage to be a threat, that steps taken to prevent it, and additional regulations being considered for promulgation in this area.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE CHAIRMAN

MAR 19 1976

Honorable Morris K. Udall, Chairman
Subcommittee on Energy and the Environment
Committee on Interior and Insular Affairs
U. S. House of Representatives

Dear Chairman Udall:

In your letter of February 17, 1976, you asked whether conventional explosives could readily be used to sabotage shipments of spent fuel.

This issue was recently addressed in testimony prepared by the staff of the Nuclear Regulatory Commission for presentation during Atomic Safety and Licensing Board hearings on the Wolf Creek Generating Station proposed by Kansas Gas and Electric Company and Kansas City Power and Light Company. The Wolf Creek testimony was not presented because the intervenors withdrew their contention on this issue. Nevertheless, I have enclosed a copy in the hope that it will satisfactorily answer the Subcommittee's questions on this matter. The testimony includes the following conclusions:

1. The design features that enable the shipping casks to withstand severe transportation accidents (e.g., multiplicity of heavy steel shells, a thick, dense gamma shield, a water jacket and sacrificial impact absorbers) also enable the casks to withstand attack by small arms fire and explosives. The staff has concluded that it would require extraordinary skills and uncommon materials to breach the inner vessel.

2. The tight packing of the fuel element(s) in the cask, the difficulty in removing the cover(s), and the level of radioactivity of the exposed fuel militate against any introduction of explosives into the cask with the intent of propelling the fuel out of the container(s).

3. A massive rupture of the cask is considered to be an incredible event.

4. A possibility exists that a small bore penetration into the inner vessel could be made. In this case, however, the radiological consequences would be relatively small.

5. It is the staff's opinion that for quick, lethal action a saboteur is more likely to choose any one of a large number of other, much more readily available, types of hazardous shipment--such as explosives and chemical agents--to accomplish his purpose. The dispersion of the radioactive material contained in spent fuel shipping casks using the scenarios discussed above is inefficient, costly, dangerous to the criminal or saboteur, requires a high degree of technical and scientific knowledge, is uncertain in its consequences, and, because of the delayed action or radioactive effects, less than feasible for an immediate threat to life.

6. A release of solid, non-volatile radioactive materials, were it to occur, would contaminate the vehicle and nearby ground. The resulting hazard, although dangerous and long lived would be restricted to the immediate vicinity of the transport vehicle.

Accordingly, current regulations are considered adequate for the protection against sabotage of shipments of spent fuel, and no additional regulations are currently being considered.

If we can be of further assistance, please advise.

Sincerely,

William A. Anders
Chairman

VI. Upgrading of Safeguard Regulations

NINETY-FOURTH CONGRESS

JAMES A. HALEY, FLA., CHAIRMAN

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

March 5, 1976

COPY

Mr. William Anders
Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Anders:

Testimony received by February 26 and 27 by the Subcommittee on Energy and the Environment implies existing systems in the nuclear industry are not capable of providing protection against threats which the NRC seems to consider plausible. In light of this, I believe the NRC should immediately either require an upgrading of security system quality or clarify its position concerning the nature of the threat.

I also urge you to increase the level of fines imposed for violations of safeguards regulations. I am skeptical of the rationale presented by Mr. Case at the February 27 hearing. In an answer to Congressman Tsongas who expressed concern that fines were too low, Mr. Case said:

> "No, sir. It is not the fine that is the real penalty. The real penalty is the public notoriety and the public pressure. That is one of the things that results from NRC imposing these fines, a lot newspaper publicity and that by far is a more expensive penalty on the company."

I would appreciate your earliest response.

Sincerely,

Morris K. Udall
Chairman, Subcommittee on
Energy and the Environment

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE CHAIRMAN

APR 7 1976

Honorable Morris K. Udall, Chairman
Subcommittee on Energy and the
Environment
Committee on Interior and
Insular Affairs
U. S. House of Representatives

Dear Chairman Udall:

In your letter of March 5, 1976, you expressed concern about the adequacy of existing nuclear industry safeguards and sought clarification of NRC's position regarding the nature of the threat.

The Commission considers its statutory obligation for the safeguarding of nuclear material and facilities to be a matter of the highest priority. It is addressing itself to this task in a variety of ways.

First, NRC engages in continual review and assessment of nuclear safeguards adequacy and threat. As a result, numerous safeguards improvements have been made by the NRC and the former Atomic Energy Commission in the last few years, and more will be made in the future. NRC is presently making a plant by plant assessment of the safeguards measures employed at each licensed facility where there are strategic quantities of plutonium and high enriched uranium. As weaknesses are identified in their programs, licensees are being directed to make needed improvements. This *ad hoc* assessment is scheduled for completion by May 1976. Safeguards improvements were also addressed in response to questions asked by the House Appropriations Committee on March 9, 1976 (see Enclosure A). In addition, NRC is examining whether existing regulatory standards against which individual plant security programs are evaluated are sufficiently stringent to assure adequate protection against threat levels as now perceived. This reassessment will be completed in the next four to eight weeks.

The Commission staff is also nearing completion of a Draft Safeguards Supplement to the Generic Environmental Statement on the wide-scale use of mixed oxide fuel in light water reactors. This document, which we will be pleased to forward to you upon its completion, is addressed to possible future development of the nuclear industry, but is expected to have major significance for the evaluation of existing safeguards as well. The Draft Safeguards Supplement will explore in depth questions of threat levels and safeguards adequacy, drawing on such sources as: the NRC Security Agency Study (mandated by the Congress in the Energy Reorganization Act of 1974); the Special Safeguards Study (initiated by the NRC itself); and assessments prepared by private firms under contract to NRC.

To complement its research in the area of threat levels and safeguards adequacy, NRC maintains regular contact with the intelligence community and with other agencies -- such as the FAA -- whose expertise in these areas may be of value. The Commission appreciates the complex and multi-faceted nature of the safeguards problem, and the necessity of continual study, monitoring and reassessment. We also are continually trying to further define the nature of the threat. Our most recent analysis of threat assessment was given to your Subcommittee on February 27, 1976, by the Director, Office of Nuclear Material Safety and Safeguards (see Enclosure B).

I would mention in this regard that on February 2, 1976, a petition was received from the Natural Resources Defense Council which requested either an immediate and drastic upgrading of safeguards at nuclear facilities (including such measures as the deployment of U.S. Marshals) or a shut-down of those facilities. That petition was denied by the Director of the Office of Nuclear Material Safety and Safeguards in a letter dated March 22, 1976. Copies of the petition and the NRC staff response are attached. (Enclosures C and D).

In your letter, you urged the imposition of stiffer fines for violations of safeguards regulations and expressed skepticism regarding the statement by the Deputy Director of the Office of Nuclear Reactor Regulation, Mr. Edson Case, that the monetary penalties imposed on licensees for a safeguards violation were of less significance to those licensees than the public pressure generated by press reports of such fines. The Commission believes that both factors are deterrents to safeguards violations. The NRC staff is currently reexamining whether increased monetary penalties, within the bounds of current statutory limitations, would further assure compliance with safeguards regulations by NRC licensees.

We appreciate your interest in this important area.

Sincerely,

Marcus A. Rowden

Marcus A. Rowden
Acting Chairman

Enclosures:
As stated

Question:

What improvements in safeguards have been made in the past few years?

Answer:

AEC regulations for physical protection of strategic quantities of plutonium and high enriched uranium were substantially strengthened in the Fall of 1973. Licensees who were authorized to possess these materials were required to submit security plans for protecting these materials during transportation and when in nuclear installations. New transportation requirements included preplanning to reduce risks in transit, provision of armed escorts arrangements for continual communication with a control point, and automatic response in the event that scheduled reports are not received. NRC regulations were amended in November 1975 to require advance notice of strategic shipments to enable NRC to make unannounced inspections to check on compliance with applicable transportation requirements. New requirements for protecting strategic special nuclear materials at nuclear installations included the use of armed guards, establishment of improved access and egress controls, use of perimeter intrusion alarms, arrangements for communication with response forces and establishment of response plans. These new requirements became effective in March 1974. To further reinforce protection of plutonium and high enriched uranium at nuclear installations, additional safeguards measures were set forth in the form of license conditions during 1975. In addition to instituting more stringent exit search procedures, a number of controls were applied to assure that emergency evacuations and drills could not be used as a diversion to conceal the removal of nuclear material from controlled areas. These measures, along with tightened access requirements, contributed to improved physical protection of strategic quantities of special nuclear material.

AEC regulations for material accounting were also substantially strengthened in the Fall of 1973. Inventory and nuclear measurement requirements were specified. Bimonthly inventory frequencies were specified for plutonium and high enriched uranium and maximum allowable measurement uncertainties were set forth for accounting systems. These new requirements became effective in May 1974. Another amendment of AEC regulations was issued in October 1974 to specify additional material control requirements. These requirements included additional checks and balances to assure against a diversion of special nuclear material, improved means for localizing inventory discrepancies in plants, reduction in time to process difficult to

measure scrap, and improved accounting and records systems. New material control license conditions have been prepared as a result of staff review of these plans, and these conditions will be made effective within a few weeks. In August 1975 NRC regulations were amended to set forth measurement control requirements for special nuclear material. These are designed to assure that proper management controls are applied to assure the quality of all nuclear measurements made for safeguards purposes. Licensees were required to submit plans for compliance with the new measures and these plans are presently being evaluated.

In addition to the general improvements described above, NRC is presently making a plant by plant assessment of the safeguards measures employed at each licensed facility which possesses strategic quantities of plutonium and high enriched uranium. As program weaknesses are identified, licensees are being directed to make needed improvements. This ad hoc assessment program is scheduled for completion by May 1976.

Question:

To what extent is the NRC considering further improvements or refinements in safeguards?

Answer:

a. A number of technical rule changes to further improve existing safeguards are presently in various stages of implementation.

   (1) Physical Protection of Nuclear Power Plants Against Sabotage. This is an addition of section 73.55 to 10 CFR and provides specific requirements for physical protection systems for nuclear power reactors.

   (2) Physical Protection of SNM in Transit. This is an amendment to 10 CFR 73.30 thru 73.35 and provides specific requirements for physical protection systems for SNM during transport.

   (3) MUF Action Rule. This is an amendment to 10 CFR to require specific action by licensees in case of excessive MUF.

Enclosure A

(4) Design Criteria. These amendments to 10 CFR Parts 50 and 70 require material protection design criteria for fuel cycle plants and reprocessing plants.

b. A number of changes in the regulatory framework are presently being considered for application to mixed oxide fuel cycle performance requirements to help identify what safeguards systems should accomplish. Performance requirements would bound the level of protection required for given amounts of various categories of nuclear material, given potential threat levels and periods of time. The salient advantages of such a performance requirement regulatory framwork are that:

- Objectives and performance criteria focus on what the safeguards systems should accomplish rather than the technical details of how.

- The safeguards system designer is permitted greater flexibility to tailor his choice of systems and equipment to accommodate site-specific factors.

- The safeguards system implementer and user is permitted flexibility in utilizing new technology to satisfy regulatory requirements.

- This approach will help provide a rational regulatory base which can be shown to be all-encompassing and consistent.

Enclosure A

EXCERPTS FROM
STATEMENT OF MR. KENNETH R. CHAPMAN
DIRECTOR, OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
U. S. NUCLEAR REGULATORY COMMISSION
BEFORE THE SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

FEBRUARY 27, 1976

Threat Level

Prior to 1970, threat of public harm as related to licensed nuclear facilities was considered primarily in terms of industrial sabotage. which could endanger the public health and safety through dispersal of radioactive material. A panel of experts reviewing safeguards for the AEC in 1967 also expressed some concern that a black market might develop for low-enriched uranium.

In the 1970-74 period, greater emphasis began to be given to the possibility that a terrorist group might decide to steal strategic special nuclear material and fashion a crude nuclear explosive in order to achieve its ends, be they political, social, or financial. Two factors which emphasized this consideration were the increase in terrorist violence and the possibility that plutonium might play a larger part in the fuel cycle for power reactors. Reacting to this concern, AEC significantly strengthened its safeguards regulations. Additional requirements were published for public comment in February 1973 and issued in effective form in November 1973, with industry being required to meet them by the spring of 1974. Improvements have been made in safeguards in a continuous basis since that time.

The concern about increased dangers to the public from hostile actions was apparent in the 1974 Congressional hearings on the Energy Reorganization Act. The interest and concern of the Congress was such that, when the Nuclear Regulatory Commission was established by the Energy Reorganization Act of 1974, it contained, by express language of the statute, the office which I now head -- the Office of Nuclear Material Safety and Safeguards.

In the past year we have conducted extensive studies dealing with the problem of threat. We have utilized expert contractors and consultants, and our people have worked extensively with others in Federal, state, and local law enforcement communities. Keeping in mind that in over 20 years of industry utilization of nuclear materials, not one member

Enclosure B

of the public has been injured by the theft and subsequent misuse of such materials or by sabotage, I believe the threat of nuclear material theft or reactor sabotage can be characterized today as follows:

- There is no information available to us which indicates that any group is planning an act of theft or sabotage against the licensed nuclear industry at this time.
- Nevertheless, there is a continuing potential for insiders to execute malevolent acts or to provide assistance to outsiders in the execution of acts which could result in adverse impacts on the nation.
- Furthermore, there are organizations with malevolent intent which could develop the capability to carry out operations against the licensed nuclear power industry.

Our studies have concluded that there is evidence to support the possibility that present threat groups may be:

- highly motivated and disciplined
- well equipped and financed
- well trained
- well prepared to execute the tasks they have selected.

Historical data on the size of terrorist groups indicates that terrorist assault groups larger than six persons are not likely to be formed. We have examined over 4000 incidents of terrorism and other antisocial behavior and were able to find 1271 cases where the number of perpetrators could be identified. The number of incidents involving groups of more than six persons account for only about 2.5 percent of the cases. Groups with as many as twelve persons have been very rare. By far the largest percentage (86%) involved groups of three persons or fewer.

There have been no instances of armed attack on licensed nuclear facilities in the 20-plus years that they have been operating. We have records of the types of violence and threats of violence which the licensed nuclear industry has experienced. These records show that during the three-year period after 1969, there

Enclosure B

were increasing numbers of bomb threats, hoaxes against power reactor sites and associated industry and education facilities, along with other acts of harassment. Since 1972, there has been a fairly constant number of hoaxes. In concert with other government agencies we are continuing to record and examine incidents, be they real acts or hoaxes, in order to track the data, observe if trends are developing and analyze these trends to determine their relevance, if any.

Since incidents as we have observed are not uncommon to any industry or institution. However, the number of threats against the licensed nuclear industry, particularly in the past three years, is indicative of the tenor of the times and serves to convince us that effective nuclear safeguards measures continue to be essential and that continued vigilance and prudent protective actions are required.

The exact threat then, to summarize, cannot be predicted with confidence, since it is an inherently uncertain problem and history is an unsure guide to the future. My assessment, however, based on currently available evidence and expert opinion is that an attack on nuclear facilities would likely stem from a relatively small number of persons, possibly aided by an insider. Present nuclear industry security measures are expected to deter most attacks and to prevent the success of such attacks as are attempted. It should be noted that the nuclear industry has customarily taken the approach of going beyond the normal precautions taken elsewhere in society in facing uncertain contingencies. The same conservative approach is being taken in nuclear safeguards, to the extent that we believe the total safeguards system for the industry, including on-site and off-site security forces, can protect against theft or sabotage attempts by groups larger than those thought to constitute the most likely threat.

Future Safeguards Against Theft

The question of whether low-enriched uranium fuel might be supplemented with recycled plutonium is under consideration. If, after the careful review now in progress, this is allowed to occur, plutonium will be recovered from spent reactor fuel and processed into mixed uranium/plutonium reactor fuel. The advent of plutonium recycle would increase the quantities of this material handled in the private sector. For planning purposes, design threat levels and safeguards measures to protect against them are being evaluated in a safeguards supplement to an environmental impact statement on plutonium recycle. This safeguards supplement is scheduled for release by the Commission for comment some time this spring. Public hearings will be held on the supplement before any final decision is reached.

Use of Federal guard forces has been considered in an intensive NRC study specifically required under the Energy Reorganization Act of 1974. While the study report, which is to be submitted to Congress in the near future, is not yet in final form, the NRC does not envision recommending at this time any major change in the allocation of guard responsibilities between the Federal and private sectors.

Natural Resources Defense Council, Inc.

917 15TH STREET, N.W.
WASHINGTON, D.C. 20005
202 737-5000

New York Office
15 WEST 44TH STREET
NEW YORK, N.Y. 10036
212 869-0150

Western Office
664 HAMILTON AVENUE
PALO ALTO, CALIF. 94301
415 327-1080

February 2, 1976

DOCKETED
USNRC
FEB 2 1976
Office of the Secretary
Docketing & Service
Section

Samuel J. Chilk
Secretary to the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Chilk:

Enclosed are six copies of the Natural Resources Defense Council's Petition for Adoption of Emergency Safeguard Measures or, Alternatively, for Revocation of Licenses. I would appreciate it if you would file copies of this document with the Commission and with the Director of Nuclear Material Safety and Safeguards.

In light of the urgent nature of the requests in the petition, we respectfully request that action on the petition be taken immediately.

Sincerely,

J.G. Speth

J.G. Speth
Attorney for Petitioner

Enclosures

Enclosure C

Acknowledged by card 2-2-76 era

BEFORE THE
NUCLEAR REGULATORY COMMISSION
UNITED STATES OF AMERICA

In the matter of		NRC Dkt. Nos.:	
LICENSEES AUTHORIZED TO	)	70-8	70-754
HOLD OR TRANSPORT	)	70-27	70-820
STRATEGIC QUANTITIES OF	)	70-33	70-925
SPECIAL NUCLEAR MATERIALS	)	70-135	70-1143
		70-143	70-1151
		70-364	70-1257
		70-371	70-1319
		70-734	et al.

NATURAL RESOURCES DEFENSE COUNCIL
PETITION FOR ADOPTION OF
EMERGENCY SAFEGUARD MEASURES
OR, ALTERNATIVELY, FOR
REVOCATION OF LICENSES

Petitioner Natural Resources Defense Council, Inc., hereby requests the Nuclear Regulatory Commission and, as appropriate, the Director of Nuclear Material Safety and Safeguards to act immediately to implement emergency safeguard measures which can assure that strategic quantities of special nuclear material (SNM) currently held or transported by licensees are protected, with an ample margin of safety, against the maximum credible threat of theft.*/ Alternatively, if such emergency safeguards cannot be devised or implemented effectively and immediately, either generally or with regard to particular

*/ The scope of this petition is limited to those facilities and activities covered by 10 CFR § 73.1 and not exempt under 10 CFR § 73.6. Strategic quantities of special nuclear material as used herein is defined in Attachment A to this petition.

facilities, petitioner requests, except in those instances where considerations of national defense require otherwise, that licenses or portions of licenses authorizing the possession or transportation of strategic quantities of special nuclear material be revoked forthwith and that federal authorities take immediate possession of such special nuclear material.

In support of this request, petitioner states as follows:

1. Numerous private corporations currently hold materials licenses and other licenses from the Nuclear Regulatory Commission which authorize the possession and transportation of strategic quantities of unirradiated special nuclear materials within the United States. Certain of these licenses are identified in Attachment A to this petition. Pursuant to these licenses, thousands of kilograms of plutonium and highly enriched uranium are now held, processed and transported within the United States by private corporations.

2. Under the Atomic Energy Act and the rules and decisions thereunder, the Commission can issue a license authorizing the possession of special nuclear material only upon making a "definitive finding" that safeguards to prevent the theft of such materials are adequate to protect against the maximum credible threat of theft. In Power Reactor Development Co. v. Electrical Union, 367 U.S. 396, 398, 407 (1961), the Supreme Court noted that the Commission's

obligation to protect the health and safety of the public requires that the agency make a "definitive finding of safety" at the time it authorizes operation of nuclear power reactors. An analogous obligation is imposed in the context of licenses to possess special nuclear materials by 42 U.S.C. § 2077, which requires that the Commission "shall not" issue a SNM license which "would be inimical to the common defense and security or would constitute an unreasonable risk to the health and safety of the public." See also 10 CFR § 70.31-32. The responsibility to protect the public has been consistently interpreted by the Commission as requiring that licensed nuclear facilities and activities be conservatively designed and operated to withstand maximum credible events. See, e.g., 39 Federal Register 30964 (August 27, 1974), where the Commission states as follows:

> "In the approach to safety reflected in the Commission's regulations, postulated accidents, for purposes of analysis, are divided into two categories - "credible" and "incredible". The former ("credible") are considered to be within the category of design basis accidents. Protective measures are required and provided for all those postulated accidents falling within that category, and proposed sites are evaluated by taking into account the conservatively calculated consequences of a spectrum of severe postulated accidents. Those accidents falling within the "incredible" category are considered to be so improbable that no such protective measures are required."

Further, the Atomic Energy Act provides for revocation, suspension or modification of licenses whenever any ". . . fact or any report, record or inspection or other means [exists] which would

warrant the Commission to refuse to grant a license on an original application . . . ." 42 U.S.C. § 2236(a). See also 10 CFR § 70.61(b).

3. Numerous studies have been recently conducted assessing the nature and size of the threat that might confront a licensee holding special nuclear materials. One such study is the Security Agency Study required by Section 204(b)(2)(C) of the Energy Reorganization Act of 1974, the draft Executive Summary of which states as follows:

> "Congressional concern for adequate safeguards was heightened as a result of a special safeguards study done for the Atomic Energy Commission in 1974. That study, by David Rosenbaum and others, . . . described a variety of potential problems and short comings in the area of nuclear safeguards and made recommendations for their solution . . . .
>
> "The Rosenbaum report expressed concern about the adequacy of protection afforded SNM by the private industrial security systems of licensees. One aspect of concern was the level of threat to facilities and SNM. The authors postulated a maximum credible threat consisting of 15 highly trained men, three of whom might be "insiders", employed by the licensee target firm."
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> * * *
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> "Threats to nuclear facilities and material can come from external or internal sources. External threats would include overt acts of theft and sabotage. They span a scale ranging from mischief and minor nuisance through coordinated attacks, which at some point would take on the character of civil war. Internal threats are most often postulated as being covert and might involve diversion of material, the perpetration of hoaxes and, perhaps, sabotage. They span a scale from minor pilferage by individuals, through collusion, all the way through revolutionary conspiracies, in which entire plants might be covertly controlled.
>
> * * * VI-15

"To estimate the credible threat, the office of Nuclear Materials Safety and Safeguards researched 19 relevant studies and conducted 9 interviews with individuals and groups of professional analysts from the FBI, the intelligence community, the Department of Defense and State and local law enforcement agencies.

"What emerged from this was a consensus estimate that an external threat group will probably number about 6-8 persons and very likely not exceed 12 persons. . . .

"Interviews and studies yielded less upon which to base estimates of threats internal to the industry. In general, the internal threat was characterized as follows:

- o One person operating alone will probably remain undetected.
- o Instances of collusion involving 2-3 persons have been encountered in industry.
- o Most hijackings involve internal collusion.
- o Key internal persons can be influenced by threats against their families or other forms of blackmail.

As a result, a credible internal threat, for safeguards purposes, is estimated to consist of 2-3 persons in collusion."

Similarly, the January 19, 1976, memorandum of Carl H. Builder, Director, Division of Safeguards, to Ronald A. Brightsen, Assistant Director for Licensing, Division of Safeguards, states:

"The design threats in the safeguards supplement to GESMO are divided into an internal (diversion) and an external (assault) threat. Many parameters or considerations must be taken into account in describing or specifying such threats. To simplify these

79-679 O - 76 - 6

descriptions, we have assumed that all of these parameters (e.g., motivation, training, arms, equipment, employment position, etc.) are fixed at worst-case values with respect to safeguards, and that the only remaining variable is the number of people involved in the threat. For a nominal or baseline threat, as a point of departure, we have assumed that the internal and external threats are two and six persons, respectively. The range of numbers suggested by threat researchers, expert opinion, and partisan comments generally lie within a factor of two, up and down, from this baseline specification."

In sum, these studies indicate that an attempt to steal plutonium or highly enriched uranium from licensed facilities or while in transit by a group of 12-15 armed outsiders or 3-4 industry employees in collusion should be considered a credible possibility. Review and assessment of these studies and other studies may indicate that the maximum credible threat is in fact significantly larger or otherwise more serious.

4. The January 19, 1976, memorandum of Carl H. Builder, referenced in paragraph 3 <u>supra</u> and attached hereto as Attachment B, assesses the adequacy of the safeguards now applied at currently licensed facilities as follows:

"Over the past six months, I have been questioned several times as to the adequacy of current safeguards. I have replied that I was not in a position to judge current safeguards as adequate or inadequate until we had logically structured both the safeguards problem and our approach to solutions. Only then, I argued, would we understand the measures by which we could judge the adequacy of safeguards.

* * *

> "If safeguards are not adequate against the lowest levels of design threat that have been suggested, then we must logically conclude that such safeguards are inadequate, quite apart from the uncertainty we may accept about what constitutes adequate safeguards. I am concerned that some or even many of our currently licensed facilities may not have safeguards which are adequate against the lowest levels of design threat we are considering in GESMO.
>
> * * *
>
> "The lowest levels of design threat being considered in GESMO are, for an internal threat, one person and, for an external threat, three persons. I don't know of any serious suggestion that these levels are too high and that we should consider even lower levels as design threats for adequate safeguards." (Emphasis supplied.)

Thus, the principal source of Commission expertise on the question of safeguards has indicated that he is "not in a position" to make a definitive finding that currently licensed facilities are adequately safeguarded and, indeed, that he is "concerned that some or even many currently licensed facilities" are not protected against even very small threats -- threats far less serious than the maximum credible threat.

5. The concerns expressed in the Builder Memorandum regarding the inadequacy of current safeguard practices confirm the conclusions of numerous independent experts. Thus, Dr. Theodore B. Taylor, a safeguards authority and consultant to the NRC, testified in his December 10, 1975 statement before the Committee on Energy and Diminishing Materials of the California State Assembly as follows:

> "Present U.S. safeguards applied to commercial plutonium and highly enriched uranium are not adequate to prevent theft by heavily armed groups with resources and motivation comparable to the Brinks gang and other groups of professional criminals that have carried out successful major robberies in the past. Though not routinely recycled in power plants, plutonium for commercial R&D purposes is now stored and transported in substantial quantities, annual shipments amounting to at least several hundred kilograms per year."

Similarly, the Special Safeguards Study ("Rosenbaum Report") prepared by Atomic Energy Commission consultants and released April 29, 1974, concluded:

> "In recent years the factors which make safeguards a real, imminent and vital issue have changed rapidly for the worse, Terrorists groups have increased their professional skills, intelligence networks, finances and level of armaments throughout the world."
>
> * * *
>
> "The factors involved in preventing the illegal acquisition of special nuclear material and the subsequent manufacture of nuclear weapons have received a great deal less attention than those associated with power plant accidents. <u>The relevant regulations are far less stringent and we feel they are entirely inadequate to meet the threat</u>. The seriousness of the problem demands a clear commitment by the AEC to bring the risk to the public from safeguards problems down to the level of public risk associated with the operation of nuclear power plants." (Emphasis supplied.)

6. The possibility that nuclear weapons materials now held by U.S. corporations under NRC licenses might be stolen and used is real and substantial. Terrorist activity and other forms of anti-social violence are an almost daily occurrence. In the

present age of sophisticated criminal organizations, bombs and bomb threats, of aircraft hijacking, of the ransom of diplomats and the murder of Olympic athletes, the risks of nuclear theft, blackmail and terrorism should not be minimized. A criminal or terrorist group, using information and equipment that are widely available, could design and build a crude nuclear bomb which could be carried in an automobile and could explode with a yield equal to at least 100 tons of high explosive. A recent report to the NRC by the Mitre Corporation, The Threat To Licensed Nuclear Facilities (MTR-7022, September 1975), reached the following conclusions:

> "The only prudent prediction is that there will continue to be international operations by most of the presently active terrorist organizations throughout the world; that new ones will spring into existence, sometimes without any warning before their first dramatic strike; and that some of these groups, driven by ideology, need for political leverage on the United States, or desperation, may choose the United States, and perhaps licensed nuclear facilities, as a target."
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> * * *
>
> "Organized crime in the United States has demonstrated the capacity to execute complicated actions with planning, coordination, secrecy, patience, and whatever level of force and armament is necessary to accomplish the job. They are interested solely in acquiring more money and power for themselves and there is no evidence that they have or ever had any motivation such as patriotism. They are involved in almost all the hijacking that goes on in the United States, and have been able to exert considerable control over substantial parts of industry, labor, and government. Their business is often international and they have longstanding and secure links in Europe, the Middle East, Latin America, and the Far East. There is little question that, for a sufficient amount of money,

> members of organized crime would take a contract to acquire special nuclear material for another party. [A] large proportion of their operations involve cooperation from people inside their target . . . ."

7. In light of the foregoing, the Commission should conclude that an adequate basis does not now exist for finding that currently applied safeguards are adequate to protect against the theft of strategic quantities of plutonium and highly enriched uranium now in the possession of licensees. Both the Director of the NRC's Safeguards Division and the agency's consultants are unable to make a definitive finding that current safeguards are adequate. Yet, unless the Commission can make such a definitive finding of safety regarding these licenses, the Commission's obligation to the public requires that such licenses be revoked forthwith. Accordingly, petitioner urges the Commission and, as appropriate, the Director of Nuclear Material Safeguards and Safety:

(a) to review immediately the safeguard programs of all facilities licensed to possess strategic quantities of special nuclear material in order to identify all such facilities for which existing safeguards are inadequate to protect, with an ample margin of safety, against the maximum credible threat of theft. The determination of an ample margin of safety is essential in light of existing uncertainties regarding the upper limit of the maximum credible threat. This review might reveal

that all such facilities are inadequately safeguarded.

(b) to develop and implement on an expedited basis emergency safeguards which can assure with an ample margin of safety that strategic quantities of special nuclear material held by licensees are protected against the maximum credible theft threat. Such emergency safeguards might include, among others, the following:

(1) immediate dispatchment of forces from the U.S. Marshals Service to appropriate fixed sites;

(2) curtailment of relevant licensee activities at fixed sites where consistent with national defense considerations;

(3) elimination of all transportation of strategic quantities of special nuclear material other than that essential to national defense; and

(4) where transportation of such special nuclear material is essential to national defense, use of forces from the U.S. Marshals Service to accompany shipments.

(c) to revoke outstanding licenses which authorize the possession of strategic quantities of special nuclear material, and to recover such material immediately, if safeguards meeting the standard set out in subparagraph (b) supra are not now in place and (1) cannot be devised or implemented quickly and effectively or (2) can be implemented only with undue difficulty or expense.

8. The Natural Resources Defense Council (NRDC) is a non-profit corporation organized under the laws of the State of New York. It is a national environmental protection organization with more than 20,000 members in 50 states. One of NRDC's major objectives is to protect its members and the public from the risks and other consequences of nuclear power development, including the risks associated with the theft or diversion of special material from licensed facilities or with attacks directed against such facilities. NRDC's interests and those it its members and the public are adversely affected by the activities of private corporations carried out pursuant to the licenses referred to herein.

For the foregoing reasons, petitioner respectfully urges that the requests made herein be granted without delay.

Respectfully submitted:

J.G. Speth

Of Counsel:

Anthony Z. Roisman
1712 N Street, N.W.
Washington, D.C. 20036

J.G. Speth
Natural Resources Defense Council
917 Fifteenth Street, N.W.
Washington, D.C. 20005
(202) 737-5000

Attorney for Petitioner

February 2, 1976

ATTACHMENT A

Companies Having Nuclear Regulatory Commission Licenses To Possess Strategic Quantities Of Special Nuclear Material */ (SNM) (Covered Under 10 CFR Part 73) At Fixed Sites **/

Sites	Operations **/
1. Babcock and Wilcox Nuclear Materials Division 609 North Warren Avenue Apollo, Penn. 15613 Parks Township facility Docket No. 70-364 License No. SNM-414	Fabricates mixed oxide (plutonium) fuel for light water reactors and for the breeder reactor R&D program.
2. Babcock and Wilcox Nuclear Materials Division 609 North Warren Avenue Apollo, Penn. 15613 Apollo facility Docket No. 70-135 License No. SNM-145	Fabricates uranium fuel for commercial reactors (may be low enriched uranium only).
3. Babcock and Wilcox Naval Nuclear Fuel Division P.O. Box 785 Lynchburg, Virginia 24505 Docket No. 70-27 License No. SNM-42	Fabricates naval reactor fuel.

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*/ Strategic quantities of special nuclear material (SNM) are either uranium-235 (containing uranium enriched to 20% or more in the U-235 isotope), uranium-233, or plutonium, or any combination of these materials which is 5 kilograms or more computed by the formula, kilograms = (kilograms containing U-235) plus 2.5 times (grams U-233 plus grams plutonium).

**/ Status as of January, 1976. Not all facilities holding such licenses are listed. Information on nature of operations is incomplete. Licenses sometimes authorize activities not now being carried out.

	Sites	Operations
4.	Battelle Memorial Institute Columbus Laboratories 505 King Avenue Columbus, Ohio 43201 Docket No. 70-8 License No. SNM-7	Research and development. Only small quantities of SNM are permitted on site at any one time.
5.	Exxon Nuclear Company 2101 Horn Rapids Road Richland, Washington 99352 Docket No. 70-1257 License No. SNM-1227	Manufactures fuel rods for power reactors and advanced fuel R&D.
6.	General Atomic Company P.O. Box 81608 San Diego, Calif. 92138 Docket No. 70-734 License No. SNM-696	Primarily HTGR fuel cycle R&D.
7.	General Electric Company Vallecitos Nuclear Center P.O. Drawer B Pleasanton, Calif. 94566 Docket No. 70-754 License No. SNM-960	Plutonium fuel R&D facility.
8.	Kerr-McGee Corporation Crescent, Oklahoma Docket No. 70-925 License No. SNM-1174	Produced mixed oxide (plutonium) fuel pellets and fabricated fuel pins for the FFTF (LMFBR R&D) programs. Operations have been terminated. The facility probably does not have significant quantities of SNM on site at this time.
9.	Nuclear Fuel Services, Inc. Erwin, Tennessee 37650 Docket No. 70-143 License No. SNM-124	Fabricates naval reactor fuel.

	Sites	Operations
10.	Rockwell International Corp. Atomics International Division P.O. Box 309 Canoga Park, California 91304 Docket No. 70-25 License No. SNM-21	Conducts broad R&D programs and nuclear fuel manufacturing activities utilizing SNM of various forms.
11.	Texas Instruments, Inc. Materials and Electrical Products Group 34 Forest Street Attleboro, Mass. 02703 Docket No. 70-33 License No. SNM-23	Processes and fabricates high enriched uranium "for Administration programs."
12.	United Nuclear Corporation Fuel Recovery Operation Wood River Junction, R.I. 02894 Docket No. 70-820 License No. SNM-777	Scrap reprocessing facility (unirradiated scrap).
13.	United Nuclear Corporation Naval Products Division 67 Sandy Desert Road Uncasville, Conn. 06382 Docket No. 70-371 License No. SNM-368	Produces nuclear fuel elements and components and complete reactor cores for naval reactors.
14.	U.S. Nuclear, Inc. P.O. Box 680 Oak Ridge, Tennessee 37830 Docket No. 70-1319 License No. SNM-1315	Produces uranium-aluminum fuel elements for test and research reactors.
15.	Westinghouse Electric Corp. Water Reactor Division Box 355 Pittsburgh, Penn. 15230 Cheswick, Penn Site Docket No. 70-1143 License No. SNM-1120	Produces mixed oxide (plutonium) fuel pellets and fabricates fuel pins for light water reactors.

Sites		Operations
16.	Westinghouse Electric Corp. Nuclear Fuel Division Drawer R Columbia, S.C. 29205 Columbia Nuclear Fuel Plant Docket No. 70-1151 License No. SNM-1107	Capability to assemble mixed oxide (plutonium) fuel pins into fuel assemblies. Probably does not have significant quantities of SNM on site at this time.

Companies Having Nuclear Regulatory Commission
Licenses To Transport Strategic Quantities
Of Special Nuclear Materials (SNM)
(Covered Under 10 CFR Part 73)

1. Edlow International Co.
   1100 17th Street, N.W.
   Suite 404
   Washington, D.C. 20036

2. Transnuclear, Inc.
   One N. Broadway
   White Plains, N.Y. 10601

In addition to these, several companies having fixed site SNM licenses covered under 10 CFR 73 also have licenses to transport strategic quantities of SNM. These include, but are not necessarily limited to, Westinghouse Electric Corp., U.S. Nuclear, and Exxon Nuclear Co.

Common Carrier With An Approved
NRC Safeguard Plan
Per 10 CFR 73

Tri-State Motor Transit Co.
Nuclear Division
P.O. Box 113
Joplin, Mo. 64801

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ATTACHMENT B

January 19, 1976

MEMORANDUM FOR: Ronald A. Brightsen, Assistant Director for Licensing, Division of Safeguards

FROM: Carl H. Builder, Director, Division of Safeguards

SUBJECT: ADEQUACY OF CURRENT SAFEGUARDS

The adequacy of safeguards is the central question that we have been struggling to approach in our GESMO-related activities over the past six months. The orientation of GESMO is toward the future: What is an adequate safeguards posture if the nation embarks upon the wide-scale use of mixed oxide (recycled plutonium) fuel in light water reactors? The draft safeguards supplement to GESMO, scheduled for publication in March, should provide the analytical and technical frameworks within which that question can be judged. As these frameworks emerge, however, it becomes apparent that they are not limited to future safeguards; they may be equally suited to judge the adequacy of current safeguards.

We recognized this eventuality some time ago. Over the past six months, I have been questioned several times as to the adequacy of current safeguards. I have replied that I was not in a position to judge current safeguards as adequate or inadequate until we had logically structured both the safeguards problem and our approach to solutions. Only then, I argued, would we understand the measures by which we could judge the adequacy of safeguards. In response to the question of when we would be in a position to make such judgments, I have stated that the safeguards portion of GESMO could not be completed until we possessed these logical structures or frameworks.

Fortunately, the logic has been found and the structures have been assembled by some very capable people who have worked very hard. The safeguards supplement to the GESMO is now being drafted around these frameworks, as are interim licensing rules. The next six to eight weeks will see the denouement of our six-month struggle to gain a position where the adequacy of safeguards might be rationally judged.

Thus, the time is almost upon us now, where we shall not only want to make judgments about future safeguards for mixed oxide fuel cycles, but be compelled by our public obligations to make judgments about the adequacy or inadequacy of current safeguards. The moment such judgments are possible, we must be prepared to move promptly to advise the Commissioners of any apparent inadequacies. We must be prepared to support such judgments with the available facts, but we should not allow fact-finding activities to become an excuse for delaying reasonable judgments where public safety and security are involved. I am soliciting your assistance in preparation for the eventuality that we may judge current safeguards to be inadequate at one or more licensed facilities.

The analytical and technical frameworks developed for GESMO focus on the theft of nuclear materials, suitable in quantity and form for the illicit manufacture of nuclear explosives, as the overriding concern of safeguards. We must have a safeguards posture that provides high confidence in our ability to prevent the theft of significant quantities of special nuclear materials (SNM). Significant quantities have been established at five formula kilograms [as defined in 10 CFR Section 73.1(b)], about half the minimum required for the manufacture of an illicit nuclear explosive. Thus, physical protection measures and material controls (i.e., containment, access, and accounting procedures) must be deemed adequate to prevent (not just detect) the theft of five formula kilograms of SNM.

We have tried to avoid the specifics of potential threats in developing the analytical framework for GESMO because such specifics are fraught with uncertainty and are invitations to argument. But we have not succeeded: there does not appear to be any way that we can analytically divorce the design of adequate safeguards from the specification of threat capabilities. Since there is no way to establish an absolute level of threat capabilities, we have been forced to design safeguards across a range of threat levels, recognizing that the final choice of design threat is a judgment call. We have varied the design threat from lowest to the highest levels that have been suggested. In between these extremes, we must admit that there is room for opinion as to where the design threat should be set and, hence, what constitutes adequate safeguards.

But at the lowest levels of design threat, we have the opportunity to define what have been called "insufficiency criteria," to define how much safeguards are not enough. If safeguards are not adequate against the lowest levels of design threat that have been suggested, then we must logically conclude that such safeguards are inadequate, quite apart from the uncertainty we may accept about what consistutes adequate safeguards. I am concerned that some or even many of our currently licensed facilities may not have safeguards which are adequate against the lowest levels of design threat we are considering in GESMO.

The design threats in the safeguards supplement to GESMO are divided into an internal (diversion) and an external (assault) threat. Many parameters or considerations must be taken into account in describing or specifying such threats. To simplify these descriptions, we have assumed that all of these parameters (e.g., motivation, training, arms, equipment, employment position, etc.) are fixed at worst-case values with respect to safeguards, and that the only remaining variable is the number of people involved in the threat. For a nominal or base-line threat, as a point of departure, we have assumed that the internal and external threats are two and six persons, respectively. The range of numbers suggested by threat researchers, expert opinion, and partisan comments generally lie within a factor of two, up and down, from this baseline specification. Thus, the lowest levels of design threat being considered in GESMO are, for an internal threat, one person and, for an external threat, three persons. I don't know of any serious suggestion that these levels are too high and that we should consider even lower levels as design threats for adequate safeguards.

The logical conclusion from all this is that current safeguards must be presumed inadequate if they cannot effectively counter internal threats of one person or external threats of three persons. It does not, of course, say that they are adequate if they can effectively counter these same threats. But there should be a higher urgency to correct what is clearly inadequate, even before finally determining what is adequate. Thus, while we are awaiting further judgments about what may be a prudent design threat level, I think we are obliged to act promptly where safeguards are insufficient against threat levels that are at the lower extreme of what may be judged prudent.

The tough questions we may soon have to answer for ourselves about currently licensed facilities (and associated transportation) are these:

1. Are present material control procedures sufficient to prevent, with a high degree of assurance, the theft of more than five formula kilograms of SNM by any single employee in any position in any single theft or in any continuing series of thefts over a period of up to one year?

2. Are present physical protection procedures sufficient to prevent, with a high degree of assurance, the theft of more than five formula kilograms of SNM by means of a well-planned and coordinated assault by three persons, one of whom may be an employee in collusion, having the equivalent of military training and equipment?

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAR 22 1976

Natural Resources Defense Council, Inc.
917 15th Street, NW.
Washington, DC 20005

Dear Sirs:

This is in response to your petition of February 2, 1976, captioned "Petition for Adoption of Emergency Safeguard Measures or, Alternatively, for Revocation of Licenses." Your petition concerns the sixteen commercial licensees who are presently authorized to possess and transport strategic quantities of special nuclear material, two exempt freight forwarders, and one common carrier with approved transportation plans. The licensees work with special nuclear materials -- subject to NRC regulations -- for a variety of purposes, but primarily for the production of reactor fuel for U. S. naval vessels and for energy research and development projects. Based upon your assessment of what you have termed the "maximum credible threat of theft," your petition asks, among other things, for immediate implementation of "emergency safeguards measures." You ask, in the alternative, that these outstanding licenses be summarily revoked, and that federal authorities take immediate possession of the special nuclear material.

Your petition was addressed to the Commission and, as appropriate, to me as Director of the Office of Nuclear Material Safety and Safeguards. Your petition was promptly published in the Federal Register with an invitation for submission of public comment. 41 Fed. Reg. 5357. Recognizing your petition to be, in substance, a request for enforcement action pursuant to 10 CFR 2.206 and 2.202, the Commission referred it to me on February 4, 1976, with instructions to consider it and all comments provided thereon. In the interim, the Commission instructed my Office to continue our comprehensive review of safeguards measures at the licensee facilities in question, a review already underway when your petition was filed. My office was also instructed to continue to take any actions within our delegated authority deemed necessary to meet regulatory responsibilities, and to promptly inform the Commission

Enclosure D

whether any special regulatory action by it is warranted prior to a determination of the merits of the petition. The Commission directed me to make that determination as soon as feasible following receipt of public comments.

My office immediately reviewed your petition and determined that it contained no information that was not already known to us. On that basis and on the basis of the information then available to us from our on-going review of the facilities in question and other sources, I advised the Commission by memorandum dated February 11, 1976, that there was no basis for immediate imposition of the kinds of "emergency safeguards measures" contemplated by your petition. A copy of that memorandum was placed in the Commission's Public Document Room and another copy is enclosed for your reference. Since that time, we have reviewed and evaluated comments from other interested persons and organizations and from the potentially affected licensees of special nuclear materials; these comments have been placed in the Public Document Room. We have also evaluated additional information now available to us from our on-going review of potentially affected facilities. I am now in a position to make my determination with respect to your requests for enforcement actions, pursuant to 10 CFR 2.206(b).

Your specific requests for action are set forth in paragraph 7, pp. 10-12 of your petition. You ask, first, for an immediate review of the adequacy of safeguard programs to protect against theft at facilities licensed to possess strategic quantities of special nuclear material. Such a review was underway before your petition was filed and is continuing.

The crux of your request, as I understand it, is for immediate implementation of "emergency safeguard measures" at licensee facilities, which you suggest might include dispatchment of U.S. Marshals to protect such facilities, elimination of transportation of special nuclear material, other than that essential to national defense, and use of U.S. Marshals to accompany necessary national defense shipments. In the alternative, if the emergency measures you suggest cannot be quickly implemented or can be implemented only with undue difficulty or expense, you ask that the outstanding licenses authorizing possession of strategic quantities of special nuclear materials be summarily revoked, and that the material be recaptured by federal

authorities. For the reasons that follow, and on the basis of relevant information presently available to me, I have determined that there is no factual or legal basis for granting these requests for summary action.

As I am sure you are aware, I do not possess unfettered discretion to impose additional requirements on outstanding licenses or to modify or revoke such licenses solely on the basis of your organization's perception of where the public interest lies. On the contrary, my authority to proceed under 10 CFR 2.202 is circumscribed by the terms of that regulation and by established principles of law. I note that your principal emergency measure suggestion -- dispatchment of U.S. Marshals to licensed facilities -- is clearly beyond my authority and that of the Nuclear Regulatory Commission. The U.S. Marshals are supervised and directed by the Attorney General and it does not appear that the authority of the Marshals would extend to protection of privately owned businesses under existing law. In this connection, I refer you to the provisions of section 569 of Title 28 of the United States Code. More importantly, your petition does not allege, and information presently available to us does not disclose, any substantial violations of NRC regulations. Apart from such violation situations, I am authorized to proceed summarily under 10 CFR 2.202 in exceptional situations, including those involving immediate hazards to public health or safety, but only where there is a substantial factual basis for such action. In my judgment, that necessary factual basis is lacking in this case. Pursuant to 2.206 (b), it is my decision not to insitute any proceedings with respect to your requests for emergency measures or summary revocation actions. For the reasons given hereafter, I believe that the present safeguards programs of the licensees in question are adequate to provide a reasonable assurance of public health and safety and are not inimical to the common defense and security.

In rejecting your requests for emergency measures and summary revocation actions, I do not mean to imply that there is no legitimate basis for concern about the adequacy of present safeguards. I am concerned about their adequacy, particularly for the future. I know that more can be done in this area, and I believe that my office will be proposing significant new regulatory requirements in the near future,

both with reference to specific sites and generally applicable requirements. The development of more refined safeguards criteria and standards is the principal purpose of our on-going reviews and studies. In my judgment, however, the precipitous actions you request are unnecessary and fail to take into account the competing interests of the licensees and the broader public interests involved. I will summarize the basis for my judgment with reference to the present factual situation, current regulatory requirements, and the actions we are taking pursuant to our Congressional safeguards mandate.

Today's licensed nuclear power industry is one which depends upon low-enriched uranium; that is, uranium enriched to approximately three percent in the fissile uranium 235 isotope. The current industry consists of fifty-seven licensed power reactors (one operating on high-enriched uranium) and nine low-enriched uranium fuel fabrication facilities. A nuclear explosive cannot be made of such low-enriched uranium, although it is classified for regulatory purposes as "special nuclear material."

There are sixteen licensees in the private sector who are authorized to possess strategic quantities of plutonium and high-enriched uranium. These kinds of special nuclear material, if stolen in sufficient quantities, could be fashioned into a crude nuclear explosive, if the thieves had the requisite technical skill and equipment.

The greatest percentage of this high-enriched uranium is government-owned and is being processed in licensed facilities for national security programs. High-enriched uranium for commercial purposes (about six percent of the total quantity in the private sector) is mostly in storage vaults and is likely to stay there unless additional high temperature gas-cooled reactors are built and operated. A small amount of high-enriched uranium is being used to fabricate research reactor fuel.

About half of the plutonium in commercial plants is government-owned. Certain licensed facilities process plutonium for development programs related to the liquid metal fast breeder reactor. Otherwise, the material is being used in small quantities for R&D purposes or is in vault storage. Thus, the amount of special nuclear material, plutonium and high-enriched uranium, being used outside national security

programs is very small and at this time is largely in vault storage.

Each firm licensed to possess specified quantities of high-enriched uranium or plutonium (substantially less than the amount necessary to make an explosive device) must comply with published safeguards requirements. A copy of these regulations (10 CFR Part 73) is attached hereto. One of these requires that a physical protection plan be submitted to the NRC for approval. The plan must demonstrate how the licensee will protect his plant against sabotage and the strategic materials in his possession against theft. The NRC promulgates regulations and imposes license conditions to make it clear to the licensee what he is expected to do in order to obtain and keep a license. Summarizing these requirements briefly, the NRC safeguards program requires that the licensee employ safeguards measures in depth, including on-site armed guards with access to law enforcement agencies; intrusion alarms backed up by structural barriers; access controls over limited access areas; exit searches; and material control and accounting.

Theft of plutonium by an employee would be extremely difficult to accomplish. As I mentioned earlier, most of the material now present in the private sector is in vault storage and essentially inaccessible to a lone insider. The material not in storage is handled or processed in enclosed, sealed containment or glove box process lines. Individuals are not allowed to work unobserved in areas housing these process lines, nor can a single individual make an authorized removal of material from such lines. If, under the scrutiny of his fellow employees, an individual is able to circumvent these measures, remove material, and conceal it on his person, he would still be subject to an exit search. As a check on the performance of safeguards, bi-monthly inventories are conducted to assure material has not been stolen.

An outside intruder must either force an entry at an access point which is manned by an armed guard or attempt covert entry. To gain entrance covertly, the intruder must surmount the fence line where intrusion alarms are located and the walls of the building housing the nuclear materials. Such buildings present significant delay times to anyone attempting to breach them since they are of substantial construction.

Any time strategic quantities of special nuclear material are shipped, plans are made before the shipment takes place. Routes are chosen to bypass areas of natural disaster or where civil disorder might occur. The shipment is picked up at the shipper's plant at a pre-arranged time by the convoy personnel, including armed guards, responsible for carrying and protecting the shipment. The material itself has already been assayed and placed into a safe container with tamper-indicating seals attached. During the shipment no intermediate stops are made to pick up or drop off other cargo. Periodic radio-telephone calls are made to report progress of the shipment. After arrival at the receiver's plant, the seals are checked, the nuclear material is unloaded and NRC and the shipper are notified. Within a short time of receipt, the receiver assays the material to verify the quantity of nuclear material shipped.

The NRC is continuously upgrading its safeguards requirements and has under consideration several changes to its present regulations to further protect against theft. One of these changes, relating to in-transit security, has been issued for public comment. 39 Fed. Reg. 40036. It would require greater numbers of armed guards to accompany certain shipments of strategic material. A regulation change to require an NRC security clearance for employees in certain job functions involving access to strategic material is now being developed by the NRC staff.

NRC has a program of inspection and enforcement to ensure that licensees comply with its safeguards requirements. If items of noncompliance are found, the licensee is expected to take prompt corrective action. If the situation warrants it, the NRC can assess a civil penalty and/or modify, suspend or revoke a license for failure to comply. For example, civil penalties were imposed on two licensees for failures to make timely implementation of upgraded safeguards requirements made effective in 1974.

In attempting to assess the present level of the threat posed by possible theft of special nuclear material, some historical perspective is necessary. Prior to 1970, threat of public harm as related to licensed nuclear facilities was considered primarily in terms of industrial sabotage which could endanger the public health and safety through dispersal of radioactive material. A panel of experts reviewing

safeguards for the AEC in 1967 also expressed some concern that a black market might develop for low-enriched uranium. But the Atomic Energy Commission rejected the contention that licensed facilities should be required to maintain safeguards capable of withstanding a military attack, and that determination was upheld in court in Siegel v. AEC, 400 F.2d 778 (C.A.D.C. 1968).

In the 1970-74 period, greater emphasis began to be given to the possibility that a terrorist group might attempt to steal an amount of special nuclear material sufficient to fashion a crude nuclear explosive in order to achieve its ends, be they political, social, or financial. Two factors which directed increased attention to this consideration were the increase in terrorist violence and the possibility that plutonium might play a larger part in the fuel cycle for power reactors. Reacting to this concern, the AEC significantly strengthened its safeguards regulations. Additional requirements were published for public comment in February 1973 and issued in effective form in November 1973, with industry being required to meet them by the spring of 1974. Improvements have been made in safeguards on a continuous basis since that time.

In the past year, my office and other elements in the Commission have conducted and have on-going extensive studies dealing with the problem of threat. We have utilized expert contractors and consultants, and our people have worked extensively with others in Federal, state, and local law enforcement communities. Keeping in mind that in over 20 years of industry utilization of nuclear materials, not one member of the public has been injured by the theft and subsequent misuse of such materials, I believe the threat of nuclear material theft or sabotage can be characterized today as follows:

> There is no information available to us which indicates that any group is planning an act of theft or sabotage against the licensed nuclear industry at this time.
>
> Nevertheless, there is a continuing potential for insiders to execute malevolent acts or to provide assistance to outsiders in the execution of acts which could harm the public.

> Furthermore, there are organizations with malevolent intent which could develop the capability to carry out operations against the licensed nuclear power industry.

Our studies have concluded that there is evidence to support the possibility that present threat groups may be highly motivated and diciplined, well equipped and financed, well trained, and well prepared to execute the tasks they have selected.

Historical data on the size of terrorists groups indicates that terrorists assault groups larger than six persons are not likely to be formed. We have examined over 4000 incidents of terrorism and other antisocial behavior and were able to find 1271 cases where the number of perpetrators could be identified. The number of incidents involving groups of more than six persons account for only about 2.5 percent of the cases. Groups with as many as twelve persons have been very rare. By far the largest percentage (86%) involved groups of three persons or fewer.

There have been no instances of armed attack on United States nuclear facilities in the 20-plus years they have been operating. We have records of the types of violence and threats of violence which the licensed nuclear industry has experienced. These records show that during the three-year period after 1969, there were increasing numbers of bomb threats, hoaxes against power reactor sites and associated industry and education facilities, along with other acts of harassment. Since 1972, there has been a fairly constant number of hoaxes. In concert with other government agencies we are continuing to record and examine such incidents, in order to track the data, observe whether trends are developing, and analyze such trends to determine their relevance, if any.

The exact threat then, to summarize, cannot be predicted with confidence, since it is an inherently uncertain problem and history is an unsure guide to the future. By its very nature, the assessment of this threat is much more judgmental that the kinds of risk assessments the NRC is able to make with respect to reactor safety questions. In this regard, I believe that your "maximum credible threat" concept, which you would analogize to quantifiable safety assessments, is unsound.

My assessment of the threat, based on currently available evidence, expert opinion and our collective judgment is that an attack on nuclear facilities would likely stem from a relatively small number of persons, possibly aided by an insider. Present nuclear industry security measures are expected to deter most attacks and to prevent the success of such attacks as are attempted. It should be noted that the nuclear industry has customarily taken the approach of going beyond the normal precautions taken elsewhere in society in facing uncertain contingencies. The same conservative approach is being taken in nuclear safeguards, to the extent that we believe the total safeguards system for the industry, including on-site and off-site security forces, can protect against theft or sabotage attempts by groups larger than those thought to constitute the most likely threat.

Concerns about the adequacy of safeguards properly tend to focus more on possible future wide-scale use of plutonium than upon its present limited use. The question of whether low-enriched uranium fuel for commercial reactors might be supplemented in the future with recycled plutonium is under consideration. The Commission's procedures for resolving this complex issue were announced recently. 40 Fed. Reg. 53056. If, after the careful review now in progress, this is allowed to occur, plutonium will be recovered from spent reactor fuel and processed into mixed uranium/plutonium reactor fuel. The advent of wide-scale plutonium recycle would increase the quantities of this material handled in the private sector. For planning purposes, design threat levels and safeguards measures to protect against them are being evaluated in a safeguards supplement to an environmental impact statement on plutonium recycle. This safeguards supplement is scheduled for release by the Commission for comment some time this spring. Public hearings will be held on the supplement before any final decision is reached. Your organization will have the opportunity to participate in those proceedings.

Use of Federal guard forces to perform safeguards functions has been considered in an intensive NRC study specifically required under the Energy Reorganization Act of 1974. While the study report, which is to be submitted to Congress in the near future, is not yet in final form, the NRC does not envision recommending at this time any major change in the allocation of guard responsibilities between the Federal and private sectors, contrary to your suggested deployment of U.S. Marshals.

You attached to your petition an internal memorandum dated January 19, 1976, from Carl H. Builder, Director of the Division of Safeguards of this office, to Ronald A. Brightsen, Assistant Director for Licensing, Division of Safeguards, entitled "Adequacy of Current Safeguards." That memorandum expresses Mr. Builder's concern that safeguards at currently licensed facilities may not be adequate against design threats now being considered for future safeguards programs. Mr. Builder has read your petition and my response to it. He concurs in my determination that your requests for emergency and summary action are not warranted by the evidence presently available.

The Commissioners have not participated in the making of this determination under 10 CFR 2.206(b), which is based solely on the investigation and recommendations of the staff, and my judgment.

Sincerely,

Kenneth R. Chapman, Director
Office of Nuclear Material
Safety and Safeguards

Enclosures:
1. Cy memo, 2/11/76, Chapman
to Commission
2. 10 CFR Part 73

FEB 11 1976

MEMORANDUM FOR: Chairman Anders
Commissioner Rowden
Commissioner Mason
Commissioner Gilinsky
Commissioner Kennedy

FROM: Kenneth R. Chapman, Director
Office of Nuclear Material Safety & Safeguards

THRU: Lee V. Gossick, Executive Director for Operations (Signed) Lee V. Gossick

SUBJECT: REGULATORY ACTION REGARDING SAFEGUARDS

This is in response to the Commission's request that it be promptly informed whether any special regulatory action is warranted to improve safeguards protection for the regulated activities listed in the Natural Resources Defense Council's (NRDC) petition for action under 10 CFR §2.206, dated February 2, 1976, prior to a determination of the merits of the petition. Comments on the petition by interested members of the public and the affected "licensees" are to be filed by February 20, 1976. As quickly thereafter as these comments can be reviewed and conclusions drawn by the staff, I will report to you on the merits of the NRDC petition, with recommendations for any actions to be taken. In the interim, if our continuing review, public responses to the petition, or any other information indicates the need for immediate specific action, I will take such action and inform you immediately.

All of the affected "licensees" listed in the NRDC petition are operating under safeguard plans reviewed and approved by the staff and all are in compliance with the present regulations in 10 CFR Parts 70 and 73. The regulations in Part 70 provide for material accounting and control requirements with respect to facility organization, material control arrangements, accountability measurements, statistical controls, inventory methods, shipping and receiving procedures, material storage practices, records and reports, and management control. The Commission's current regulations in 10 CFR Part 73 provide requirements for the physical security and protection of fixed sites and transportation involving strategic quantities of nuclear materials. Physical security requirements for protecting fixed sites include the establishment and training of a security organization (including armed guards), provision of physical barriers, establishment of access controls, use of intrusion alarms, arrangements for communication with response forces, and establishment of response plans.

With regard to continuing to meet regulatory responsibilities, we have been making and will continue to make during our ongoing activities, changes in plant procedures on an individual facility basis to improve safeguards even when those changes transcend technical compliance with existing regulations. We are in this sense looking for the most effective arrangements possible at each facility under current safeguards concepts.

Over the past year the staff has had underway, through numerous avenues, a review of current safeguard regulations. This review has involved several major studies, extensive contacts with other federal agencies and individual experts, and nuclear facility visits. The purpose of this activity has been twofold; to judge the effectiveness of present safeguard arrangements, and to evaluate the merits of and need for new concepts in our future treatment of safeguards for special nuclear materials. For example, we are examining the merits of increased emphasis on physical containment procedures in our approach to material controls. Mr. Builder's memorandum of 19 January, cited by the NRDC, reflects our development and examination of new conceptual approaches that would involve threat-specific criteria for the evaluation of safeguards. Our analyses are not yet complete; they have not been offered for public comment; nor have they yet been approved by me. These new approaches, different from our current regulatory approach to safeguards, have neither been validated or adopted. This staff activity should not be construed as evidence that current safeguards are inadequate. Our efforts to examine new safeguards concepts have been accelerated so the preliminary conclusions reached may in part contribute to my consideration of the NRDC petition.

With respect to any immediate threat to the affected facilities, a number of which are providing services essential to the national security, we are aware of both current intelligence information and a wide variety of expert opinion. Based on knowledge derived from these sources, our review of current safeguard regulations, our ongoing studies in the safeguards area, and the results of our continuing inspection of the affected plants, I perceive no reasonable cause for taking actions beyond the prompt and thoroughgoing ones that have already been initiated.

Original Signed by

K. R. Chapman

Kenneth R. Chapman, Director
Office of Nuclear Material Safety
and Safeguards

PART 73 PHYSICAL PROTECTION OF PLANTS AND MATERIALS

AUTHORITY: Sec. 161, 68 Stat. 948 (42 U.S.C. 2201). Interpret or apply secs. 53, 183, 68 Stat. 930, 954 (42 U.S.C. 2073, 2233); secs. 202, 206, Pub. L. 93-438, 88 Stat. 1244, 1246 (42 U.S.C. 5842, 5846)

GENERAL PROVISIONS

§ 73.1 Purpose and scope.

38 FR 35430

(a) *Purpose*. This part prescribes requirements for physical protection of special nuclear material at fixed sites and in transit and of plants in which special nuclear material is used, for the purpose of protection against acts of industrial sabotage and protection of special nuclear material against theft by establishment and maintenance of a physical protection system of: (1) Protective barriers and intrusion detection devices at fixed sites to provide early detection of an attack, (2) deterrence to attack by means of armed guards and escorts, and (3) liaison and communication with law enforcement authorities capable of rendering assistance to counter such attacks.

(b) *Scope*. (1) This part prescribes requirements for (i) the physical protection of production and utilization facilities licensed pursuant to Part 50 of this chapter; (ii) the physical protection of plants in which activities licensed pursuant to Part 70 of this chapter are conducted, and the physical protection of special nuclear material, by any person who pursuant to the regulations in Part 70 of this chapter possesses or uses at any site or contiguous sites subject to control by the licensee, uranium-235 (contained in uranium enriched to 20 percent or more in the U–235 isotope), uranium-233, or plutonium alone or in any combination in a quantity of 5,000 grams or more computed by the formula, grams*=(grams contained U-235) + 2.5 (grams U-233 + grams* plutonium).

38 FR 35430

(2) This part prescribes requirements for the physical protection of special nuclear material in transportation by any person who is licensed pursuant to the regulations in Part 70 of this chapter who imports, exports, transports, delivers to a carrier for transport in a single shipment, or takes delivery of a single shipment free on board at the point where it is delivered to a carrier, either uranium-235 (contained in uranium enriched to 20 percent or more in the U–235 isotope), uranium-233, or plutonium, or any combination of these materials, which is 5,000 grams or more computed by the formula, grams=(grams contained U–235) +2.5 (grams U–233+grams plutonium).

(3) This part also applies to shipments by air of special nuclear material in quantities exceeding (i) 20 grams or 20 curies, whichever is less, of plutonium or uranium-233, or (ii) 350 grams of uranium-235 (contained in uranium enriched to 20 percent or more in the U–235 isotope).

(4) Special nuclear material subject to this part may also be protected pursuant to security procedures prescribed by the Commission or another Government agency for the protection of classified materials. The provisions and requirements of this part are in addition to, and not in substitution for, any such security procedures. Compliance with the requirements of this part does not relieve any licensee from any requirement or obligation to protect special nuclear material pursuant to security procedures prescribed by the Commission or other Government agency for the protection of classified materials.

§ 73.2 Definitions.

As used in this part:

(a) Terms defined in Parts 50 and 70 of this chapter have the same meaning when used in this part.

(b) "Authorized individual" means any individual, including an employee, a consultant, or an agent of a licensee, who has been designated in writing by a licensee to have responsibility for surveillance of special nuclear material.

(c) "Guard" means a uniformed individual armed with a firearm whose primary duty is the protection of special nuclear material against theft and/or the protection of a plant against industrial sabotage.

38 FR 35430

(d) "Watchman" means an individual, not necessarily uniformed or armed with a firearm, who provides protection for a plant and the special nuclear material therein in the course of performing other duties.

(e) "Continuous visual surveillance" means unobstructed view at all times of a shipment of special nuclear material and of all access to a temporary storage area or cargo compartment containing the shipment.

(f) "Physical barrier" means

(1) Fences constructed of No. 11 American wire gauge, or heavier wire fabric, topped by three strands or more of barbed wire or similar material on brackets angled outward between 30° and 45° from the vertical, with an overall height of not less than eight feet, including the barbed topping.

(2) Building walls constructed of stone, brick, cinder block, concrete, steel or comparable materials (openings in which are secured by grates, doors, or covers of construction and fastening of sufficient strength such that the integrity of the wall is not lessened by any opening), or walls of similar construction, not part of a building, provided with a

* Amended 39 FR 2352.

barbed topping described in paragraph (f)(1) of this section of a height of not less than 8 feet.

(3) Ceilings and floors constructed to offer resistance to penetration equivalent to that of building walls described in paragraph (f)(2) of this section.

(g) "Protected area" means an area encompassed by physical barriers and to which access is controlled.

(h) "Vital area" means any area which contains vital equipment within a structure, the walls, roof, and floor of which constitute physical barriers of construction at least as substantial as walls as described in paragraph (f)(2) of this section.

(i) "Vital equipment" means any equipment, system, device, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation. Equipment or systems which would be required to function to protect public health and safety following such failure, destruction, or release are also considered to be vital.

(j) "Material access area" means any location which contains special nuclear material, within a vault or a building, the roof, walls, and floor of which each constitute a physical barrier.

(k) "Isolation zone" means any area, clear of all objects which could conceal or shield an individual, adjacent to a physical barrier, which is monitored to detect the presence of individuals or vehicles within that area.

(l) "Intrusion alarm" means a tamper indicating electrical, electromechanical, electro-optical, electronic or similar device which will detect intrusion by an individual into a building, protected area, vital area, or material access area, and alert guards or watchmen by means of actuated visible and audible signals.

(m) "Lock" in the case of vaults or vault type rooms means a three-position, manipulation resistant, dial type, built-in combination lock or combination padlock and in the case of fences, walls, and buildings means an integral door lock or padlock which provides protection equivalent to a six-tumbler cylinder lock. "Lock" in the case of a vault or vault type room also means any manipulation resistant, electromechanical device which provides the same function as a built-in combination lock or combination padlock, which can be operated remotely or by the "reading" or insertion of information, which can be uniquely characterized, and which allows operation of the device. "Locked" means protected by an operable lock.

(n) "Vault" means a burglar-resistant windowless enclosure with walls, floor and roof of: (1) Steel at least one-half inch thick, (2) reinforced concrete or stone at least 8 inches thick, (3) non-reinforced concrete or stone at least 12 inches thick, or (4) monolithic floor or roof construction of equivalent resistance to entry, with a built-in lock in a steel door at least 1 inch thick, exclusive of the locking mechanism.

(o) "Vault-type room" means a room with one or more doors, all capable of being locked, protected by an intrusion alarm which creates an alarm upon the entry of a person anywhere into the room and upon exit from the room or upon movement of an individual within the room.

38 FR 36430

(p) "Industrial sabotage" means any deliberate act directed against a plant in which an activity licensed pursuant to the regulations in this chapter is conducted, or to any component of such a plant, which could directly or indirectly endanger the public health and safety by exposure to radiation, other than such acts by an enemy of the United States, whether foreign government or other person.

40 FR 8774

(q) "ERDA" means the Energy Research and Development Administration or its duly authorized representatives.

40 FR 52840

(r) "Appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix A" means:

(1) For domestic shipments—the Regional Office within whose region the licensee who is responsible for the physical protection arrangements of the shipment is located.

(2) For export shipments—the Regional Office within whose region the licensee who is responsible for the physical protection arrangements of the shipment is located, and the Regional Office for the region in which the last point of exit of the shipment from the U.S. is located.

(3) For import shipments—the Regional Office within whose region the licensee who is responsible for the physical protection arrangements of the shipment is located, and the Regional Office for the region in which the first point of entry of the shipment into the U.S. is located.

38 FR 36430

§ 73.3 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be recognized as binding upon the Commission.

40 FR 8774

§ 73.4 Communications.

Except where otherwise specified, all communications and reports concerning the regulations in this part should be addressed to the Director of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, or may be delivered in person at the Commission's offices at 1717 H Street, NW., Washington, D.C.; at 7920 Norfolk Avenue, Bethesda, Maryland.

38 FR 36430

§ 73.5 Specific exemptions.

The Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security, and are otherwise in the public interest.

40 FR 52840

§ 73.6 Exemptions for certain quantities and kinds of special nuclear material.

A licensee is exempt from the requirements of §§ 73.30 through 73.36, and of §§ 73.60, 73.70 and 73.72 of this part, with respect to the following special nuclear material:

(a) Uranium-235 contained in uranium enriched to less than 20 percent in the U-235 isotope;

(b) Special nuclear material which is not readily separable from other radioactive material and which has a total external radiation dose rate in excess of 100 rems per hour at a distance of 3 feet from any accessible surface without intervening shielding; and

(c) Special nuclear material in a quantity not exceeding 350 grams of uranium-235, uranium-233, plutonium, or a combination thereof, possessed in any analytical, research, quality control, metallurgical or electronic laboratory.

Physical Protection of Special Nuclear Material in Transit

38 FR 36430

§ 73.30 General requirements.

(a) Except as specified in § 73.36(a) or as otherwise authorized pursuant to § 73.30(f), each licensee who transports or who delivers to a carrier for transport either uranium-235 (contained in uranium enriched to 20 percent or more in the U-235 isotope), uranium-233, or plutonium, or any combination of these materials, which is 5,000 grams or more computed by the formula, grams=(grams contained U-235)+2.5 (grams U-233+grams plutonium), shall make arrangements to assure that such special nuclear material will, if a common or contract carrier is used, be transported under the established procedures of a carrier which provides a system for the physical protection of valuable material in transit and requires an exchange of hand-to-hand receipts at origin and destination and at all points enroute where there is a transfer of custody.

(b) Transit times of shipments other than those specified in § 73.1(b)(3) shall be minimized and routes shall be selected to avoid areas of natural disaster or civil disorders. Such shipments shall be preplanned to assure that deliveries occur at a time when the receiver at the final delivery point is present to accept receipt of shipment.

(c) Special nuclear material shall be shipped in containers which are sealed by tamper indicating type seals. The container shall also be locked if it is not in another container or vehicle which is locked. If inspection of the container or vehicle is not required by State or local authorities before final destination, the outermost container or vehicle shall also be sealed by tamper indicating type seals. No container weighing 500 pounds or less shall be shipped in open trucks, railroad flat cars or box cars and ships. This paragraph does not apply to shipments of quantities specified in § 73.1(b)(3).

(d) When guards are used pursuant to §§ 73.31(c)(1), 73.31(c)(2), 73.33 and 73.35, the licensee shall not permit an individual to act as a guard unless there is documentation that the individual

has been qualified by demonstrating an understanding of his duties and responsibilities. The licensee or his agent shall have documentation that guards have been requalified annually.

(e) By January 7, 1974, each licensee shall submit a plan outlining the procedures that will be used to meet the requirements of §§ 73.30 through 73.36 and 73.70(g) including a plan for the selection, qualification, and training of armed escorts, or the specification and design of a specially designed truck or trailer as appropriate. This plan shall be followed by the licensee after March 6, 1974.

38 FR 35430

(f) A licensee or applicant for a license may apply to the Commission for approval of proposed procedures for transport of special nuclear material in a manner not otherwise authorized by the regulations of this part. Such application shall include a description and quantity of the special nuclear material involved, the origin and destination, the carriers to be used, the expected time in transit, the number of transfer points, the communications to be used, the vehicle visual identification, and the cargo security and surveillance measures to be used.

(g) Paragraphs (b), (c), (d), and (f) of this section are effective March 6, 1974.

§ 73.31 Shipment by road.

(a) All shipments by road shall be made without any scheduled intermediate stops to transfer special nuclear material or other cargo between the facility from which it is shipped and the facility of the receiver.

39 FR 2352

(b) All motor vehicles used to transport special nuclear material shall be equipped with a radiotelephone which can communicate with a licensee or his agent. The licensee or agent with whom communications shall be maintained for different segments of the shipment shall be predesignated before a shipment is made. Calls to such licensee or agent shall be made at least every 2 hours when radiotelephone or conventional telephone coverage along the route is available to relay position and projected route. Call frequency may extend up to 5 hours when radiotelephone or conventional telephone coverage is not available along the preplanned route, at which time a conventional telephone call shall be made. In the event no call is received in accordance with these requirements, the licensee or his agent shall immediately notify an appropriate law enforcement authority and the appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix A of this part.

38 FR 35430

(c) A shipment shall be accompanied by at least two people in the vehicle containing the shipment, which may be two drivers or one driver and an authorized individual. The vehicle containing the shipment shall be under continuous visual surveillance, or one of the drivers or authorized individuals shall be in the cab of the vehicle, awake, and not in a sleeper berth. The shipment shall be further protected by one of the following methods:

(1) An armed escort consisting of at least two guards shall accompany the shipment in a separate escort vehicle. Escorts shall maintain continuous vigilance for the presence of conditions or situations which might threaten the security of the shipment, take such action as circumstances might require to avoid interference with continuous safe passage of the cargo vehicle, provide assistance to, or summon aid for crew of cargo vehicles in case of emergency, check seals and locks at each stop where time permits, and observe the cargo vehicle and adjacent areas during stops or layovers. Continuous radio communication capability shall be provided between the cargo vehicle and the escort vehicle. Escort vehicles shall also be equipped with a radiotelephone. The licensee may use his own employees as armed escorts or he may use an agent. Only the driver is required in the vehicle containing special nuclear material for shipments involving an average of less than an hour in transportation, if communication is maintained during the course of the shipment with the licensee or agent monitoring the shipment.

(2) The shipment shall be made in a specially designed truck or trailer which reduces the vulnerability to diversion. Design features of the truck or trailer shall permit immobilization of the van and provide barriers or deterrents to physical penetration of the cargo compartment unless armed guards are also used in which case immobilization of the vehicle is not required.

38 FR 35430

(d) Transfers to and from other modes of transportation shall be in accordance with § 73.35.

(e) Vehicles shall be marked on top with identifying letters or numbers which will permit identification of the vehicle under daylight conditions from the air in clear weather at 1,000 feet above ground level. The same code of letters and numbers as those used on the top shall also be marked on the sides and rear of the vehicle to permit identification from the ground.

(f) This section is effective March 6, 1974.

§ 73.32 Shipment by air.

(a) Except as specifically approved by the Nuclear Regulatory Commission, no shipment of special nuclear material shall be made in passenger aircraft in excess of (1) 20 grams or 20 curies, whichever is less, of plutonium or uranium-233, or (2) 350 grams of uranium-235 (contained in uranium enriched to 20 percent or more in the U-235 isotope).

(b) In shipments on cargo aircraft of either uranium-235 (contained in uranium enriched to 20 percent or more in the U-235 isotope), uranium-233 or plutonium, or any combination of these materials which is 5,000 grams or more computed by the formula, grams = (grams contained U-235) + 2.5(grams U-233 + grams plutonium), transfers shall be in accordance with § 73.35. Transfers shall be minimized.

(c) Export shipments shall be escorted by an unarmed authorized individual, who may be a crew member, from the last terminal in the United States until the shipment is unloaded at a foreign terminal. He shall perform monitoring duties at foreign terminals as described in § 73.35.

(d) Paragraph (c) of this section is effective March 6, 1974.

§ 73.33 Shipment by rail.

(a) A shipment by rail shall be escorted by two guards, in the shipment car or an escort car of the train, who shall keep the shipment cars under observation and who shall detrain at stops when practicable and time permits to guard the shipment cars under observation, and check car or container locks and seals. Radiotelephone communication shall be maintained with a licensee or his agent to relay position every 2 hours or less, and at scheduled stops in the event that radiotelephone coverage was not available in the last 5 hours before the stop. The licensee or agent with whom communications shall be maintained for different segments of the shipment shall be predesignated before a shipment is made. In the event no call is received in accordance with these requirements, the licensee or his agent shall immediately notify an appropriate law enforcement authority and the appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix A of this part.

38 FR 35430

(b) Transfers shall be in accordance with § 73.35.

(c) This section is effective March 6, 1974.

§ 73.34 Shipment by sea.

(a) Shipments shall be made on vessels making the minimum ports of call. Transfers to and from other modes of transportation shall be in accordance with § 73.35. There shall be no scheduled transfers to other ships. At domestic ports of call where other cargo is transferred, the shipments shall be protected in accordance with § 73.35(a).

(b) The shipment shall be placed in a secure compartment which is locked and sealed. Locks and seals shall be periodically inspected in transit, if accessible, by an escort or crew member.

(c) Export shipments shall be escorted by an unarmed authorized individual, who may be a crew member, from the last port in the United States until the shipment is unloaded at a foreign port. He shall perform monitoring duties at foreign ports as described in § 73.35.

(d) Ship-to-shore communications shall be available, and a ship-to-shore contact shall be made every twenty-four hours to relay position information, and the status of the shipment, which shall be determined by a daily inspection where possible. This information shall be sent, as often as it is available, to the licensee or his agent who makes the arrangements for the protection of the shipment.

(e) This section is effective March 6, 1974.

§ 73.35 Transfer of special nuclear material.

All transfers shall be monitored by a

guard. An alternate guard shall be designated at all transfer points to substitute, if necessary. Monitoring of special nuclear material transfers shall be conducted as follows:

(a) At scheduled intermediate stops where special nuclear material is not scheduled for transfer, the guard shall observe the opening of the cargo compartment and assure that the shipment is not removed. The guard shall maintain continuous visual surveillance of the cargo compartment. Continuous visual surveillance of the cargo compartment shall be maintained up to the time the vehicle is ready to depart. The guard shall observe the vehicle until it has departed, and shall notify the licensee or his agent of the latest status immediately thereafter.

(b) At points where special nuclear material is transferred from a vehicle to storage, from one vehicle to another, or from a storage to a vehicle, the guard shall keep the shipment under continuous visual surveillance by observing the opening of the cargo compartment of the incoming vehicle and assuring that the shipment is complete by checking locks and/or seals. Continuous visual surveillance of a shipment shall be maintained at all times it is in the terminal or in storage. Shipments shall be preplanned in order to avoid storage times in excess of 24 hours. Continuous visual surveillance of the cargo compartment shall be maintained up to the time the vehicle is ready to depart from the terminal. The guard shall observe the vehicle until it has departed, and shall notify the licensee or his agent of the latest status immediately thereafter.

(c) The guard shall be required to immediately notify the carrier and the licensee who made the arrangements for protection of special nuclear material of any deviation from or attempted interference with schedule or routing.

(d) This section is effective March 6, 1974.

§ 73.36 Miscellaneous requirements.

(a) Each licensee who takes delivery of special nuclear material free on board (f.o.b.) the point at which it is delivered to a carrier for transport shall make the arrangements to assure that such special nuclear material will be protected in transit as prescribed in §§ 73.30 through 73.36, other than the person who delivers such shipment to the carrier for transport.

(b) Each licensee who imports special nuclear material shall make arrangements to assure that such material will be protected in transit as follows:

(1) An individual designated by the licensee or his agent, or as specified by a contract of carriage, shall confirm the container count and examine locks and/or seals for evidence of tampering, at the first place in the United States at which the shipment is discharged from the arriving carrier.

(2) The shipment shall be protected at the first terminal at which it arrives in the United States and all subsequent terminals as provided in §§ 73.30 through 73.35 and paragraphs (c) and (f) of this section.

(c) (1) Each licensee who delivers special nuclear material to a carrier for transport shall immediately notify the consignee by telephone, telegraph, or teletype, of the time of departure of the shipment, and shall notify or confirm with the consignee the method of transportation, including the names of carriers, and the estimated time of arrival of the shipment at its destination. (2) In the case of a shipment free on board (f.o.b.) the point where it is delivered to a carrier for transport, each licensee shall, before the shipment is delivered to the carrier, obtain written certification from the licensee who is to take delivery of the shipment at the f.o.b. point that the physical protection arrangements required by §§ 73.30 through 73.36 for licensed shipments have been made. When a contractor exempt from the requirements for a Commission license is the consignee of a shipment, the licensee shall, before the shipment is delivered to the carrier, obtain written certification from the contractor who is to take delivery of the shipment at the f.o.b. point that the physical protection arrangements required by ERDA Manual or NRC Manual Chapters 2401 or 2405, as appropriate, have been made.

(c) (3) Each licensee who delivers special nuclear material to a carrier for transport or releases special nuclear material f.o.b. at the point where it is delivered to a carrier for transport shall also make arrangements with the consignee to be notified immediately by telephone and telegraph or teletype, of the arrival of the shipment at its destination.

(d) In addition to complying with the requirements specified in paragraphs (c) and (f) of this section, each licensee who exports special nuclear material shall comply with the requirements specified in §§ 73.30 through 73.35, as applicable, up to the first point where the shipment is taken off the vehicle outside the United States. The licensee shall also make arrangements with the consignee to be notified immediately by telephone and telegraph, teletype, or cable, of the arrival of the shipment at its destination, or of any such shipment that is lost or unaccounted for after the estimated time of arrival at its destination.

(e) Each licensee who receives a shipment of special nuclear material shall immediately notify by telephone and telegraph or teletype, the person who delivered the material to a carrier for transport and the Director of the appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix A of the arrival of the shipment at its destination. When an Energy Research and Development Administration (ERDA) license-exempt contractor is the consignee, the licensee who is the consignor shall notify by telephone and telegraph, or teletype, the Director of the appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix A of the arrival of the shipment at its destination immediately upon being notified of the receipt of the shipment by the license-exempt contractor as arranged pursuant to paragraph (c)(3) of this section. In the event such a shipment fails to arrive at its destination at the estimated time, the consignee, if a licensee, or in the case of an export shipment, the licensee who exported the shipment, shall immediately notify by telephone and telegraph or teletype, the Director of the appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix A of this part, and the licensee or other person who delivered the material to a carrier for transport. The licensee who made the physical protection arrangements shall also immediately notify by telephone and telegraph, or teletype, the Director of the appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix A of the action being taken to trace the shipment.

(f) Each licensee who makes arrangements for physical protection of a shipment of special nuclear material as required by §§ 73.30 through 73.36 shall immediately conduct a trace investigation of any shipment that is lost or unaccounted for after the estimated arrival time and file a report with the Commission as specified in § 73.71. If the licensee who conducts the trace investigation is not the consignee, he shall also immediately report the results of his investigation by telephone and telegraph, or teletype to the consignee.

(g) Paragraphs (a), (b), (c) and (d) of this section are effective March 6, 1974.

Physical Protection Requirements at Fixed Sites

§ 73.40 Physical protection: General requirements at fixed sites.

Each licensee shall provide physical protection against industrial sabotage and against theft of special nuclear material at the fixed sites where licensed activities are conducted. Security plans submitted to the Atomic Energy Commission for approval shall be followed by the licensee after March 6, 1974.

§ 73.50 Requirements for physical protection of licensed activities.

In addition to any other requirements of this part, each licensee who is authorized to operate a fuel reprocessing plant pursuant to Part 50 of this chapter or who possesses or uses uranium-235 (contained in uranium enriched to 20 percent or more in the U-235 isotope), uranium-233, or plutonium alone or in any combination in a quantity of 5000 grams or more computed by the formula, grams = (grams contained U-235) + 2.5 (grams U-233 + grams plutonium), other than in the operation of a nuclear reactor licensed pursuant to Part 50 of this chapter, shall comply with the following.

(a) *Physical security organization.* (1) The licensee shall establish a security organization, including guards, to protect his facility against industrial sabotage and the special nuclear material in his possession against theft.

(2) At least one supervisor of the security organization shall be on site at all times.

(3) The licensee shall establish, main-

tain and follow written security procedures which document the structure of the security organization and which detail the duties of guards, watchmen, and other individuals responsible for security.

(4) The licensee shall not permit an individual to act as a guard or watchman unless such individual has been properly trained and equipped and has qualified by demonstrating: (i) An understanding of the licensee's security procedures, and (ii) the ability to execute all duties required of him by such procedures. Each guard and watchman shall be requalified at least annually. Such requalification shall be documented.

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(b) *Physical barriers.* (1) The licensee shall locate vital equipment only within a vital area, which, in turn, shall be located within a protected area such that access to vital equipment requires passage through at least two physical barriers. More than one vital area may be within a single protected area.

(2) The licensee shall locate material access areas only within protected areas such that access to the material access area requires passage through at least two physical barriers. More than one material access area may be within a single protected area.

(3) The physical barrier at the perimeter of the protected area shall be separated from any other barrier designated as a physical barrier within the protected area, and the intervening space monitored or periodically checked to detect the presence of persons or vehicles so that the facility security organization can respond to suspicious activity or to the breaching of any physical barrier.

(4) An isolation zone shall be maintained around the physical barrier at the perimeter of the protected area and any part of a building used as part of that physical barrier. The isolation zone shall

be monitored to detect the presence of individuals or vehicles within the zone so as to allow response by armed members of the licensee security organization to be initiated at the time of penetration of the protected area. Parking facilities, both for employees and visitors, shall be located outside the isolation zone.

(5) Isolation zones and clear areas between barriers shall be provided with illumination sufficient for the monitoring required by paragraph (b) (3) and (4) of this section, but not less than 0.2 foot candles.

(c) *Access requirements.* The licensee shall control all points of personnel and vehicle access into a protected area, including shipping or receiving areas, and into each vital area. Identification of personnel and vehicles shall be made and authorization shall be checked at such points.

(1) At the point of personnel and vehicle access into a protected area, all individuals, except employees who possess an NRC or ERDA personnel security clearance, and all hand-carried packages shall be searched for devices such as firearms, explosives, and incendiary devices, or other items which could be used for industrial sabotage. The search shall be conducted either by a physical search or by the use of equipment capable of detecting such devices. Employees who possess an NRC or ERDA personnel security clearance shall be searched at random intervals. Subsequent to search, drivers of delivery and service vehicles shall be escorted at all times while within the protected area.

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(2) All packages being delivered into the protected area shall be checked for proper identification and authorization. Packages other than hand-carried packages shall be searched at random intervals.

(3) A picture badge identification system shall be used for all individuals who are authorized access to protected areas without escort.

(4) Access to vital areas and material access areas shall be limited to individuals who are authorized access to vital equipment or special nuclear material and who require such access to perform their duties. Authorization for such individuals shall be provided by the issuance of specially coded numbered badges indicating vital areas and material access areas to which access is authorized. Unoccupied vital areas and material access areas shall be protected by an active intrusion alarm system.

(5) Individuals not employed by the licensee shall be escorted by a watchman, or other individual designated by the licensee, while in a protected area and shall be badged to indicate that an escort is required. In addition, each individual not employed by the licensee shall be required to register his name, date, time, purpose of visit, employment affiliation, citizenship, name and badge number of the escort, and name of the individual to be visited. Except for a driver of a delivery or service vehicle, an individual not employed by the licensee who requires frequent and extended access to a protected area or a vital area need not be escorted provided such individual is provided with a picture badge, which he must receive upon entrance into the protected area and which he must return each time he leaves the protected area, which indicates (i) nonemployee-no escort required, (ii) areas to which access is authorized, and (iii) the period for which access has been authorized.

(6) No vehicles used primarily for the conveyance of individuals shall be permitted within a protected area except under emergency conditions.

(7) Keys, locks, combinations, and related equipment shall be controlled to minimize the possibility of compromise and promptly changed whenever there is evidence that they have been compromised. Upon termination of employment of any employee, keys, locks, combinations, and related equipment to which that employee had access shall be changed.

(d) *Detection aids.* (1) All alarms required pursuant to this part shall annunciate in a continuously manned central alarm station located within the protected area and in at least one other continuously manned station, not necessarily within the protected area, such that a single act cannot remove the capability of calling for assistance or otherwise responding to an alarm. All alarms shall be self-checking and tamper indicating. The annunication of an alarm at the onsite central alarm station shall indicate the type of alarm (e.g., intrusion alarm, emergency exit alarm, etc.) and location. All intrusion alarms, emergency exit alarms, alarm systems, and line supervisory systems shall at minimum meet the performance and reliability levels indicated by GSA Interim Federal Specification W-A-00450 B (GSA-FSS).

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(2) All emergency exits in each protected area and each vital area shall be alarmed.

(e) *Communication requirements.* (1) Each guard or watchman on duty shall be capable of maintaining continuous communication with an individual in a continuously manned central alarm station within the protected area, who shall be capable of calling for assistance from other guards and watchmen and from local law enforcement authorities.

(2) The alarm stations required by paragraph (d) (1) of this section shall have conventional telephone service for communication with the law enforcement authorities as described in paragraph (e) (1) of this section.

(3) To provide the capability of continuous communication, two-way radio voice communication shall be established in addition to conventional telephone service between local law enforcement authorities and the facility and shall terminate at the facility in a continuously manned central alarm station within the protected area.

(4) All communications equipment, including offsite equipment, shall remain operable from independent power sources in the event of loss of primary power.

(f) *Testing and maintenance.* Each licensee shall test and maintain intrusion alarms, emergency alarms, communications equipment, physical barriers, and other security related devices or equipment utilized pursuant to this section as follows:

(1) All alarms, communications equipment, physical barriers, and other security related devices or equipment shall be maintained in operable and effective condition.

(2) Each intrusion alarm shall be functionally tested for operability and required performance at the beginning and end of each interval during which it is used for security, but not less frequently than once every seven (7) days.

(3) Communications equipment shall be tested for operability and performance not less frequently than once at the beginning of each security personnel work shift.

(g) *Response requirement.* (1) The licensee shall establish liaison with local law enforcement authorities. In developing his physical security plan, the licensee shall take account of the probable size and response time of the local law enforcement authority assistance.

(2) Upon detection of abnormal presence or activity of persons or vehicles within an isolation zone, a protected area, a material access area or a vital area, or upon evidence of intrusion into a protected area, a material access area or a vital area, the facility security organization shall (i) determine whether or not a threat exists, (ii) assess the extent of the threat, if any, and (iii) take immediate measures to neutralize the threat, either by appropriate action by facility guards or by calling for assistance from local law enforcement authorities, or both.

(h) This section is effective March 6, 1974.

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§ 73.60 Additional requirements for the physical protection of special nuclear material at fixed sites.

In addition to the applicable requirements of § 73.50, each licensee who pursuant to the regulations in Part 70 of this chapter possesses at any site or contiguous sites subject to control by the licensee uranium-235 (contained in uranium enriched to 20 percent or more in the U-235 isotope), uranium-233, or plutonium alone or in any combination in a quantity of 5,000 grams or more computed by the formula, grams = (grams contained U-235) + 2.5 (grams U-233 + grams plutonium) shall protect the special nuclear material from theft or diversion as follows:

(a) *Access requirements.* (1) Special nuclear material shall be stored or processed only in a material access area. No activities other than those which require access to special nuclear material or equipment employed in the process, use, or storage of special nuclear material, shall be permitted within a material access area.

(2) Material access areas shall be located only within a protected area to which access is controlled.

(3) Special nuclear material not in process shall be stored in a vault equipped with an intrusion alarm or in a vault-type room, and each such vault or vault-type room shall be controlled as a separate material access area.

(4) Enriched uranium scrap in the form of small pieces, cutings, chips, solutions or in other forms which result from a manufacturing process, contained in 30-gallon or larger containers, with a uranium-235 content of less than 0.25 grams per liter, may be stored within a

locked and separately fenced area which is within a larger protected area provided that the storage area is no closer than 25 feet to the perimeter of the protected area. The storage area when unoccupied shall be protected by a guard or watchman who shall patrol at intervals not exceeding 4 hours, or by intrusion alarms.

(5) Admittance to a material access area shall be under the control of authorized individuals and limited to individuals who require such access to perform their duties.

(6) Prior to entry into a material access area, packages shall be searched for devices such as firearms, explosives, incendiary devices, or counterfeit substitute items which could be used for theft or diversion of special nuclear material.

(7) Methods to observe individuals within material access areas to assure that special nuclear material is not diverted shall be provided and used on a continuing basis.

(b) *Exit requirement*. Each individual, package, and vehicle shall be searched for concealed special nuclear material before exiting from a material access area unless exit is into a contiguous material access area. The search may be carried out by a physical search or by use of equipment capable of detecting the presence of concealed special nuclear material.

(c) *Detection aid requirement*. Each unoccupied material access area shall be locked and protected by an intrusion alarm on active status. All emergency exits shall be continuously alarmed.

(d) *Testing and maintenance*. Each licensee shall test and maintain intrusion alarms, physical barriers, and other devices utilized pursuant to the requirements of this section as follows:

(1) Intrusion alarms, physical barriers, and other devices used for material protection shall be maintained in operable condition.

(2) Each intrusion alarm shall be inspected and tested for operability and required functional performance at the beginning and end of each interval during which it is used for material protection, but not less frequently than once every seven (7) days.

(e) This section is effective March 6, 1974.

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RECORDS AND REPORTS

§ 73.70 Records.

Each licensee subject to the provisions of §§ 73.30 through 73.36 and/or § 73.50 and/or § 73.60 shall keep the following records:

(a) Names and addresses of all individuals who have been designated as authorized individuals.

(b) Names, addresses, and badge numbers of all individuals authorized to have access to vital equipment or special nuclear material, and the vital areas and material access areas to which authorization is granted.

(c) A register of visitors, vendors, and other individuals not employed by the licensee recorded pursuant to § 73.60(c)(6).

(d) A log indicating name, badge number, time of entry, reason for entry, and time of exit of all individuals granted access to a normally unoccupied vital area.

(e) Documentation of all routine security tours and inspections, and of all tests, inspections, and maintenance performed on physical barriers, intrusion alarms, communications equipment, and other security related equipment used pursuant to the requirements of this part.

(f) A record at each onsite alarm annunciation location of each alarm, false alarm, alarm check, and tamper indication that identifies the type of alarm, location, alarm circuit, date, and time. In addition, details of response by facility guards and watchmen to each alarm, intrusion, or other security incident shall be recorded.

(g) Shipments of special nuclear material subject to the requirements of this part, including names of carriers, major roads to be used, flight numbers in the case of air shipments, dates and expected times of departure and arrival of shipments, names and addresses of the monitor and one alternate monitor at each transfer point, verification of communication equipment on board the transfer vehicle, names of individuals who are to communicate with the transport vehicle, container seal descriptions and identification, and any other information to confirm the means utilized to comply with §§ 73.30 through 73.36. Such information shall be recorded prior to shipment. Information obtained during the course of the shipment such as reports of all communications, change of shipping plan including monitor changes, trace investigations and others shall also be recorded.

(h) Procedures for controlling access to protected areas and for controlling access to keys for locks used to protect special nuclear material.

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§ 73.71 Reports of unaccounted for shipments, suspected theft, unlawful diversion, or industrial sabotage.

(a) Each licensee who conducts a trace investigation of a lost or unaccounted for shipment pursuant to § 73.36(f) shall immediately report to the Director of the appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix A, by telephone, telegram, or teletype, the details and results of his trace investigation and shall file within a period of fifteen (15) days a written report to the Director of the appropriate Inspection and Enforcement Regional Office with a copy to the Director of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, setting forth the details and results of the trace investigation.

(b) Each licensee shall report immediately to the Director of the appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix A, by telephone, telegram, or teletype, any incident in which an attempt has been made, or is believed to have been made, to commit a theft or unlawful diversion of special nuclear material which he is licensed to possess, or to commit an act of industrial sabotage against his plant. The initial report shall be followed within a period of fifteen (15) days by a written report submitted to the Director of the appropriate Inspection and Enforcement Regional Office, with a copy to the Director of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, setting forth the details of the incident. Subsequent to the submission of the written report required by this paragraph, a licensee shall immediately inform the Director of the appropriate Inspection and Enforcement Regional Office by means of a written report of any substantive additional information, which becomes available to the licensee, concerning the incident.

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ENFORCEMENT

§ 73.72 Requirement for advance notice of shipment of special nuclear material.

Each licensee who plans to import, export, transport, deliver to a carrier for transport in a single shipment, or take delivery of a single shipment free on board at the point where it is delivered to a carrier quantities of special nuclear material as specified in § 73.1(b)(2) shall notify the Director of the appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix A by U.S. Mail, postmarked at least seven days in advance of the shipping date. The following information shall be furnished in the advance notice: shipper, receiver, carrier(s), estimated date and time of departure and arrival, transfer point(s), and mode(s) of shipment. The Director of the appropriate Nuclear Regulatory Commission Inspection and Enforcement Regional Office shall also be notified by telephone seven days in advance of the shipping date that an advance shipping notice has been sent by mail, and of any changes to the shipment itinerary prior to the shipment date. Road shipments or transfers with one-way transit times of one hour or less in duration between installations of a licensee are exempt from the requirements of this section.

40 FR 57840

§ 73.80 Violations.

An injunction or other court order may be obtained prohibiting any violation of any provision of the Atomic Energy Act of 1954, as amended, or Title II of the Energy Reorganization Act of 1974, or any regulation or order issued thereunder. A court order may be obtained for the payment of a civil penalty imposed pursuant to section 234 of the Act for violation of section 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Act, or section 206 of the Energy Reorganization Act of 1974, or any rule, regulation, or order issued thereunder, or any term, condition, or limitation of any license issued thereunder, or for any violation for which a license may be revoked under section 186 of the Act. Any person who willfully violates any provision of the Act or any regulation or order issued thereunder may be guilty of a crime and, upon conviction, may be punished by fine or imprisonment or both, as provided by law.

40 FR 8774

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Appendix A

UNITED STATES NUCLEAR REGULATORY COMMISSION

INSPECTION AND ENFORCEMENT REGIONAL OFFICES

Region	Address	Telephone	
		Daytime	Nights and Holidays
I Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont	Region I, USNRC Office of Inspection and Enforcement 631 Park Avenue King of Prussia, Pa. 19406	(215) 337-1150	(215) 337-1150
II Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Virginia, and West Virginia	Region II, USNRC Office of Inspection and Enforcement 230 Peachtree St., N.W. Suite 818 Atlanta, Ga. 30303	(404) 526-4503	(404) 526-4503
III Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, and Wisconsin	Region III, USNRC Office of Inspection and Enforcement 799 Roosevelt Road Glen Ellyn, Ill. 60137	(312) 858-2660	(312) 858-2660
V Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington, and Wyoming	Region V, USNRC Office of Inspection and Enforcement 1990 N. California Blvd. Suite 202 Walnut Creek, Calif. 94596	(415) 486-3141	(415) 486-3141

40 FR 42857

rules and regulations

This section of the FEDERAL REGISTER contains regulatory documents having general applicability and legal effect most of which are keyed to and codified in the Code of Federal Regulations, which is published under 50 titles pursuant to 44 U.S.C. 1510.

The Code of Federal Regulations is sold by the Superintendent of Documents. Prices of new books are listed in the first FEDERAL REGISTER issue of each month.

Title 10—Energy

CHAPTER I—NUCLEAR REGULATORY COMMISSION

PART 71—PACKAGING OF RADIOACTIVE MATERIAL FOR TRANSPORT AND TRANSPORTATION OF RADIOACTIVE MATERIAL UNDER CERTAIN CONDITIONS

PART 73—PHYSICAL PROTECTION OF SPECIAL NUCLEAR MATERIAL

Packaging and Transportation of Special Nuclear Material by Air: Continuation of Shipments During Pendency of Rule Making Proceeding

On June 2, 1975, the Nuclear Regulatory Commission published in the FEDERAL REGISTER (40 FR 23768) a notice that it was initiating a rulemaking proceeding concerning the air transportation of radioactive materials, including packaging, with a view to the possible amendment of its regulations in 10 CFR Parts 71 and 73, adopted pursuant to the Atomic Energy Act of 1954, as amended. Interested persons were invited to submit comments and suggestions to the Commission by August 1, 1975.

In the same notice, the Commission published its interim evaluation of the question of whether its current regulations allowing air transportation of special nuclear materials should remain in effect during the rule making proceeding. The Commission tentatively concluded that, in light of present information as to the safety and security of air shipment of radioactive material, there was no sound basis for requiring the suspension of air shipments of special nuclear material. The Commission's tentative evaluation took into account the following factors:

In more than 25 years of shipping special nuclear material, including plutonium, in civilian aircraft, there have been no air accidents involving the material.

The experience in shipping thousands of packages per year of all forms of radioactive materials by all modes of transport under existing NRC, DOT, and FAA regulations has been very favorable.

The requests for suspension that had been received as of that date did not set forth any significant new information which would indicate that present package or security requirements are inadequate.

In view of the physical security measures now required by 10 CFR Part 73, the protection provided against severe accidents by the high integrity packaging required by NRC, DOT, and FAA regulations, the consistency of these requirements with international standards, the low accident probability, and the favorable experience to date, the risk involved in the transportation of radioactive material under currently effective regulations were believed to be small.

Notwithstanding its tentative conclusions, in view of the concerns expressed and the fact that requests had been received for the suspension of air shipments of plutonium and other special nuclear materials, comments were specifically invited on the matter of whether suspension or other limitations on the air transportation of plutonium and other special nuclear materials are justified during the period that the rule making proceeding is being conducted.

Views on this matter, together with the supporting basis for such views, were invited to be submitted to the Commission by July 2, 1975.

After consideration of the comments received and other information and factors discussed below, the Commission has reaffirmed its tentative conclusion set out in the notice published in the FEDERAL REGISTER on June 2, 1975, with respect to special nuclear materials (other than plutonium that is not contained in a medical device designed for individual human application).

Twenty-six comments were received on the question of the Commission's interim evaluation set out in the June 2 notice.

The comments received, which represented a wide spectrum of views on the subject at issue, did not present any new information that would support the suspension of or other limitations on the air transportation of special nuclear material.

The Attorney General of the State of New York submitted his view that air transportation of special nuclear material should be suspended pending completion of the rule making proceeding and the accompanying environmental impact statement. The bases for his view were contained in affidavits submitted in an action instituted by the State of New York against the Commission and several other Federal agencies in the United States District Court for the Southern District of New York, seeking, among other things, an injunction against issuance of licenses permitting transport by air and related connecting transport of plutonium and other special nuclear materials from, in, and over the City and State of New York and the United States and its territories

The affidavits filed by the State of New York contended that air shipment of special nuclear materials endangers the lives of New York citizens in two ways:

1. The possibility of an aircraft accident resulting in a release of special nuclear materials or radiation from them; and

2. The possibility of terrorist activities directed toward such materials in the course of air transport or related connecting transport resulting in:

(a) Deliberate dispersal of radioactive materials;

(b) Manufacture of nuclear weapons; or

(c) Accidental release of radioactive materials.

New York's affidavits regarding the *health* hazards of air shipment, like most of the concerns that have been expressed recently about air transportation of special nuclear material, relate to the possible consequences of an accidental release of a significant quantity of plutonium. It is assumed that the reason that plutonium is discussed more than uranium is that plutonim poses a much greater radiological health hazard than either low or high enriched uranium, due to its much greater radioactivity per unit mass, and its radiobiological characteristics. Uranium 233 exists only in small experimental quantities at this time and is rarely transported by air. Enriched uranium, whether of low or high enrichment, would not present a significant radiological health hazard even if a significant quantity were to be released in an aircraft accident. The low accident probability and the favorable experience to date with containers used to transport uranium 233 and uranium 235 demonstrate that the probability of an accident resulting in significant dispersal is extremely small.

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For plutonium, other than in medical devices, the material regarded as most hazardous by most of the commenters, the question of continued air shipment at the present time has been foreclosed by Pub. L. 94-79, enacted August 9, 1975. It provides, among other things, that

> "The Nuclear Regulatory Commission shall not license any shipments by air transport of plutonium in any form, whether exports, imports or domestic shipments: *Provided, however*, That any plutonium in any form contained in a medical device designed for individual human application is not subject to this restriction. This restriction shall be in force until the Nuclear Regulatory Commission has certified to the Joint Committee on Atomic Energy of the Congress that a safe container has been developed and tested which will not rupture under crash and blast-testing equivalent to the crash and explosion of a high-flying aircraft."

Should such certifications be made in the future, they would of course demonstrate the absence of any cause for the health concerns put forward in the New York affidavits.

New York's contentions regarding the possibility of terrorist activities do apply equally to high enriched uranium 235 and plutonium. However, New York has failed to show that air transportation and associated ground transport are inherently more vulnerable to such activities than alternative modes of transportation that may be available. Indeed, air transportation may have significant advantages over other modes of transportation from this standpoint. Because transit time is minimized and the airport of destination can be quickly altered if necessary, opportunities for theft or acts of sabotage are reduced. Once in the air, special nuclear materials are significantly less vulnerable to hijacking than is the case for surface modes of transportation. These advantages are not demonstrably outweighed by the greater mobility the successful hijackers of an air shipment might enjoy; an airplane is, if anything, easier to track and find than an itinerant truck.

It should be noted that the United States District Court for the Southern District of New York has denied the State of New York's request for preliminary injunction in the action in which the affidavits submitted as comments were filed.

Based on the foregoing, including the considerations stated in the June 2 notice described supra, the Commission has concluded that the air transportation of special nuclear material, other than plutonium, under currently effective regulations needs not, and should not, be suspended or otherwise limited during the period that the rule making proceeding, noticed on June 2, 1975, is being conducted.

Dated at Washington, D.C. this 3rd day of February 1976.

For the Nuclear Regulatory Commission.

SAMUEL J. CHILK,
Secretary of the Commission.

[FR Doc.76-3485 Filed 2-6-76;8:45 am]

VI-54

Title 10—Energy

CHAPTER I—NUCLEAR REGULATORY COMMISSION

PART 50—LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

Codes and Standards for Nuclear Power Plants and Technical Information

On September 30, 1974, the Atomic Energy Commission published in the FEDERAL REGISTER (39 FR 35180) proposed amendments to its regulations, 10 CFR Part 50, "Licensing of Production and Utilization Facilities," which would modify the basis for establishing which revisions of referenced codes and standards should be applied to the construction and operation of certain components of water-cooled nuclear power plants. Also the proposed amendments would incorporate by reference new addenda to the referenced codes and standards, delete obsolete references, correct typographical errors and make minor changes to Appendix G of Part 50. Interested persons were invited to submit written comments for consideration in connection with the proposed amendments by October 30, 1974.

On October 11, 1974 the Energy Reorganization Act of 1974[1] was enacted into law. This Act provided for the abolition of the Atomic Energy Commission. Section 201 of this Act provided for the establishment of a Nuclear Regulatory Commission and a transfer to this new Commission of all the licensing and related regulatory functions of the Atomic Energy Commission. In addition, section 301 of the Act provided that any proceedings pending before the AEC at the time of its abolition shall, to the extent that such proceedings relate to functions transferred by the Act, be continued.

Upon consideration of the comments received and other factors involved, the Nuclear Regulatory Commission has adopted the proposed amendments with certain modifications in the form set forth below. These amendments have been changed substantially in §50.55a(g), "Inservice Inspection Requirements", to provide consistency in design requirements and to minimize interference with the established equipment procurement practices and inservice examination practices of the nuclear power industry. Some of the more significant changes to § 50.55a(g) from the proposed rule are:

a. The effective rule requires that an operating license for a utilization facility be subject to the conditions specified in § 50.55a(g), "Inservice Inspection Requirements."

b. To eliminate the misconception that the design of components needs to be continually modified and to provide a consistency between the design requirements for inspectability and the design requirements for construction, the provision on design requirements for inspectability of components has been changed to refer to the same code edition which is applied to the construction of such components.

c. The rule specifies inservice inspection requirements which apply to utilization facilities whose construction permits were issued prior to January 1, 1971.

d. Provisions in the rule for continued updating of requirements for inservice inspection to achieve compliance with more recent editions of the referenced code have been simplified and permit examination and testing programs to be

[1] Pub. L. 93-438 (88 Stat. 1233).

updated at intervals of 40- and 20-months, respectively.

e. The rule specifies actions to be taken by a licensee when a revised inservice inspection program for a facility conflicts with the technical specifications or when a requirement of a subsequent edition of the referenced code is deemed impractical by the licensee and is not included in the inservice inspection program.

f. A provision has been added to the rule that the Commission may either (1) exempt the licensee from certain requirements determined to be inequitable and for which compliance may result in an undue burden without providing a significant increase in safety or (2) require the licensee to follow an augmented program when the Commission deems that additional assurance of structural reliability is necessary.

The Commission believes these changes adopted will facilitate the orderly application of new inservice inspection requirements in Section XI of the ASME Code which are incorporated by reference to operating nuclear power plants without causing significant modifications to the plant or an intolerable impact on the inservice inspection program. Also the Commission believes these changes adopted will provide an equivalent increase in the protection of the health and safety of the public to that which would be provided by the proposed rule.

The amendments to § 50.55a set forth below which the Commission has adopted include the following:

a. References to published codes and addenda whose requirements must be met were changed to include Addenda through the Winter 1973 Addenda.

b. For a utilization facility for which a construction permit is issued on or after July 1, 1974 the rule requires that the determination of which code revision applies to a component be based on the docket date of the application for a construction permit rather than the date of issuance of the construction permit. This change should permit a more accurate assessment by the applicant of the code edition and addenda that will be in effect at the time components are ordered and thereby facilitate his procurement of long lead time components which are ordered well in advance of the construction permit date.

c. The rule modifies inservice inspection requirements applicable to components of nuclear power plants throughout the service life of the facility. Examination and testing requirements that become effective in new editions and addenda of Section XI of the ASME Code and are incorporated by reference in § 50.55a would become applicable to all operating plants to the degree practical. The Commission will review such code changes with respect to impact on the existing operating facilities prior to incorporating by reference any new editions and addenda of Section XI.

The amendments to Appendix G conform the referenced edition and addenda of the ASME Code in that Appendix to those specified by § 50.55a(b), including the periodic amendments and also clarify the upper-shelf energy requirements for beltline materials.

Other amendments delete references to obsolete documents and correct typographical errors.

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, and Sections 552 and 553 of Title 5 of the United States Code, the following amendments to Title 10, Chapter I, Code of Federal Regulations, Part 50 are published as a document subject to codification.

§ 50.34 [Amended]

1. In § 50.34 of 10 CFR Part 50, the second sentence of paragraph (b)(6)(iii) and the associated footnote 3 are deleted.

2. In § 50.55a of 10 CFR Part 50, the prefatory language and paragraph (b) are amended; in paragraphs (c)(2), (d)(2), (e)(2), and (f)(2) the first sentence is amended by adding the words "but before July 1, 1974," following the words "after January 1, 1971,"; new paragraphs (c)(3), (d)(3), (e)(3), and (f)(3) are added; and paragraphs (g) and (h) are revised to read as follows:

§ 50.55a Codes and standards.

Each operating license for a utilization facility shall be subject to the conditions in paragraph (g) of this section and each construction permit for a utilization facility shall be subject to the following conditions in addition to those specified in § 50.55:

* * * * *

(b) As used in this section, references [1] to editions of Criteria, Codes and Standards include only those editions through 1971; references [1] to Addenda include only those Addenda through the Winter 1973 Addenda.

* * * * *

(c) Pressure vessels:

* * * * *

(3) For construction permits issued on or after July 1, 1974, pressure vessels which are part of the reactor coolant pressure boundary [2] shall meet the requirements for Class 1 components set forth in Section III of the ASME Boiler and Pressure Vessel Code and Addenda [1,4] in effect [4] on the date of order [4] of the pressure vessel or 18 months prior to the formal docket date of the application for construction permit, whichever is later: *Provided*, That the applicable provisions for pressure vessels shall be no earlier than those of the Summer 1972 Addenda of the 1971 edition. The pressure vessels may meet the requirements set forth in subsequent editions of this Code and Addenda which become effective.

(d) Piping:

* * * * *

(3) For construction permits issued on or after July 1, 1974, piping which is part of the reactor coolant pressure boundary [2] shall meet the requirements for Class 1 components set forth in Section III of the ASME Boiler and Pressure Vessel Code and Addenda [1,4] in effect on the date of order [4] of the piping or 6 months prior to the formal docket date of the application for construction permit, whichever is later: *Provided*, That the applicable ASME Code provisions for piping shall be no earlier than those of the Winter 1972 Addenda of the 1971 edition. The piping may meet the requirements set forth in subsequent editions of this Code and Addenda which become effective.

(e) Pumps:

* * * * *

(3) For construction permits issued on or after July 1, 1974, pumps which are part of the reactor coolant pressure boundary [2] shall meet the requirements for Class 1 components set forth in Section III of the ASME Boiler and Pressure Vessel Code and Addenda [1,4] in effect [4] on the date of order [4] of the pump or 12 months prior to the formal docket date of the application for construction permit, whichever is later: *Provided*, That the applicable ASME Code provisions for pumps shall be no earlier than those of the Winter 1972 Addenda of the 1971 edition. The pumps may meet the requirements set forth in subsequent editions of this Code and Addenda which become effective.

(f) Valves:

* * * * *

(3) For construction permits issued on or after July 1, 1974, valves which are part of the reactor coolant pressure boundary [2] shall meet the requirements for Class 1 components set forth in Section III of the ASME Boiler and Pressure Vessel Code and Addenda [1,4] in effect [4] on the date of order [4] of the valve or 12 months prior to the formal docket date of the application for construction permit, whichever is later: *Provided*, That the applicable ASME Code provisions for valves shall be no earlier than those of the Winter 1972 Addenda of the 1971 edition. The valves may meet the requirements set forth in subsequent editions of this Code and Addenda which become effective.

(g) Inservice inspection requirements.

(1) For a facility whose construction permit was issued prior to January 1, 1971, components (including supports) shall meet the requirements of paragraphs (g)(4) and (g)(5) of this section to the extent practical. Components which are part of the reactor coolant pressure boundary [2] and their supports shall meet the requirements applicable to components which are classified as ASME Code Class 1. Other safety-related pressure vessels, piping, pumps and valves shall meet the requirements applicable to components which are classified as ASME Code Class 2 or Class 3.

(2) For a facility whose construction permit was issued on or after January 1, 1971, but before July 1, 1974, components (including supports) which are classified as ASME Code Class 1 and Class

[1] These incorporation by reference provisions were approved by the Director of the Federal Register on March 17, 1972, and May 4, 1973.

shall be designed and be provided with access to enable the performance of (i) inservice examination of such components (including supports) and (ii) tests for operational readiness of pumps and valves, and shall meet the preservice examination requirements set forth in editions of Section XI of the ASME Boiler and Pressure Vessel Code and Addenda [5,6] in effect 6 months prior to the date of issuance of the construction permit. The components (including supports) may meet the requirements set forth in subsequent editions of this code and addenda which become effective.

(3) For a facility whose construction permit was issued on or after July 1, 1974:

(i) Components which are classified as ASME Code Class 1 shall be designed and be provided with access to enable the performance of inservice examination of such components and shall meet the preservice examination requirements set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda [5,6] applied to the construction of the particular component in accordance with paragraph (c), (d), (e), or (f) of this section.

(ii) Components which are classified as ASME Code Class 2 and Class 3 and supports for components which are classified as ASME Code Class 1, Class 2, and Class 3 shall be designed and be provided with access to enable the performance of inservice examination of such components and shall meet the preservice examination requirements set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda [5,6] applied to the construction of the particular component.

(iii) Pumps and valves which are classified as ASME Code Class 1 shall be designed and be provided with access to enable the performance of inservice testing of the pumps and valves for assessing operational readiness set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda [6] applied to the construction of the particular pump or valve in accordance with paragraphs (e) and (f) of this section or the Summer 1973 Addenda, whichever is later.

(iv) Pumps and valves which are classified as ASME Code Class 2 and Class 3 shall be designed and be provided with access to enable the performance of inservice testing of the pumps and valves for assessing operational readiness set forth in Section XI of editions of the Boiler and Pressure Vessel Code and Addenda [6] applied to the construction of the particular pump or valve or the Summer 1973 Addenda, whichever is later.

(v) All components (including supports) may meet the requirements set forth in subsequent editions of codes and addenda or portions thereof which become effective.

(4) Throughout the service life of a facility, components (including supports) which are classified as ASME Code Class 1, Class 2 and Class 3 shall meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda [5,6] that become effective subsequent to editions specified in paragraphs (g)(2) and (g)(3) of this section and are incorporated by reference in paragraph (b) of this section, to the extent practical within the limitations of design, geometry and materials of construction of the components.

(i) The initial inservice examinations conducted during the first 40 months shall comply with the requirements in the editions of the code and addenda in effect no more than 6 months prior to the date of start of facility commercial operation.

(ii) The inservice examinations conducted during successive 40-month periods throughout the service life of the facility thereafter shall comply with those requirements in editions of the code and addenda in effect no more than 6 months prior to the start of each 40-month period.

(iii) The initial inservice tests of pumps and valves for assessing operational readiness and system pressure tests conducted during the first 20 months shall comply with those requirements in editions of the code and addenda in effect no more than 6 months prior to the start of facility commercial operation.

(iv) Inservice tests of pumps and valves for assessing operational readiness and system pressure tests conducted during successive 20-month periods throughout the service life of the facility shall comply with those requirements in editions of the code and addenda in effect no more than 6 months prior to the start of each 20-month period.

(v) For an operating facility whose operating license was issued prior to March 1, 1976, the provisions of paragraph (g)(4) of this section shall become effective after September 1, 1976, at the start of the next regular 40-month period of a series of such periods beginning at the start of facility commercial operation.

(5)(i) The inservice inspection program for a facility shall be revised by the licensee, as necessary, to meet the requirements of paragraph (g)(4) of this section.

(ii) If a revised inservice inspection program for a facility conflicts with the technical specification for the facility, the licensee shall apply to the Commission for amendment of the technical specifications to conform the technical specification to the revised program. This application shall be submitted at least 6 months before the start of the period during which the provisions become applicable as determined by paragraph (g)(4) of this section.

(iii) If the licensee has determined that conformance with certain code requirements is impractical for his facility, the licensee shall notify the Commission and submit information to support his determinations.

(iv) Where an examination or test requirement by the code or addenda is determined to be impractical by the licensee and is not included in the revised inservice inspection program as permitted by paragraph (g)(4) of this section, the basis for this determination shall be demonstrated to the satisfaction of the Commission not later than 12 months after the expiration of the initial 120-month period of operation from start of facility commercial operation and each subsequent 120-month period of operation during which the examination or test is determined to be impractical.

(6)(i) The Commission will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical and may grant such relief as it determines is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

(ii) The Commission may require the licensee to follow an augmented inservice inspection program for systems and components for which the Commission deems that added assurance of structural reliability is necessary.

(h) Protection systems: For construction permits issued after January 1, 1971, protection systems shall meet the requirements set forth in editions or revisions of the Institute of Electrical and Electronics Engineers Standard: "Criteria for Protection Systems for Nuclear Power Generating Stations," (IEEE-279) in effect [7] on the formal docket date of the application for a construction permit. Protection systems may meet the requirements set forth in subsequent editions or revisions of IEEE-279 which become effective.

Appendix A [Amended]

3. In Appendix A of 10 CFR Part 50, Criterion 23 is amended by deleting the word "fall" and substituting therefor the word "fail".

Appendix G [Amended]

4. In Appendix G, paragraph II.A is amended by deleting the phrase "1971 Edition, and Addenda through the Winter 1972 Addenda [1]," and substituting therefor the phrase "edition and addenda [1] as specified by § 50.55a, Codes and Standards."

5. In Appendix G, paragraph IV.B. is revised to read as follows:

IV. * * *

B. Reactor vessel beltline materials shall have minimum upper-shelf energy, as determined from Charpy V-notch tests on unirradiated specimens in accordance with paragraph NB-2322.2(a) of the ASME Code of 75 ft lbs unless it is demonstrated to the Commission by appropriate data and analyses that lower values of upper-shelf fracture energy still provide adequate margin for deterioration from irradiation.

* * * * *

Appendix H [Amended]

6. In Appendix H, paragraph II.A is amended by deleting the term "(E 1MeV)" and substituting therefor the term "(E>1MeV)".

7. In Appendix H, paragraph II.C.3.a. is amended by deleting the term "IV.-B." and substituting therefor "III.B".

Effective date. These amendments become effective on March 15, 1976.

(Secs. 103, 104, 1611, Pub. Law 83-703; 68 Stat. 936, 937, 948, (42 U.S.C. 2133, 2134, 2201(i)))

Dated at Washington, D.C., this 6th day of February 1976.

F r the Nuclear Regulatory Commission.

SAMUEL J. CHILK,
Secretary of the Commission.

[FR Doc.76-4104 Filed 2-11-76;8:45 am]

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

April 20, 1976

COPY

Mr. Marcus A. Rowden
Acting Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Rowden:

On March 5, I expressed to Chairman Anders my concern that NRC licensees' security would not provide adequate protection against threats which the NRC considered plausible. Your response of April 7 indicated that safeguards systems were being evaluated continually and improvements instituted as was deemed necessary.

I, of course, am aware that assessment of security is a continuing activity. However, it is not clear from your response whether the NRC believes it necessary to protect against the threats discussed by Mr. Builder in his January 19 memorandum and by Mr. Chapman in his February 27 testimony. Assuming it were necessary to protect against such threats, it is also not clear from your response whether, on the basis of your recent assessments, you considered that existing procedures were generally acceptable or you determined it necessary to institute improved security measures.

I would appreciate, therefore, specific information concerning the types of threats against which the NRC believes it is necessary to provide protection. Please also indicate whether guard forces--for transportation, fuel cycle facilities, or reactors--have been qualitatively or quantitatively upgraded since Mr. Builder prepared his memorandum.

Mr. Marcus A. Rowden April 20, 1976

Finally, I am interested in documentation to support your assertion with regard to the utility of fines in the deterrance of violations of safeguards regulations.

Sincerely,

Morris K. Udall
Chairman, Subcommittee on
Energy and the Environment

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

May 21, 1976

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and
Insular Affairs
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

On April 20, 1976 you wrote to Chairman Rowden inquiring whether the Nuclear Regulatory Commission believed it necessary to protect against threats discussed in Mr. Builder's memorandum of January 19 and by Mr. Chapman in his February 27 testimony before the Subcommittee on Energy and Environment.

Chairman Rowden has asked me to advise you that a response to your letter is currently under discussion by the Commission and that we anticipate that an answer will be forthcoming in a short time.

We sincerely regret this delay which, I trust, you will understand is attributable only to the Commission's desire to be fully responsive to your inquiry.

Sincerely,

Carlton Kammerer

Carlton Kammerer, Director
Office of Congressional Affairs

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 20 1976

OFFICE OF THE CHAIRMAN

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and Insular Affairs
United States House of Representatives
Washington, D. C. 20515

Dear Mr. Chairman:

In your letter of April 20, 1976, you stated that it was not clear whether the Nuclear Regulatory Commission believes it necessary to protect against threats discussed by Mr. Builder in his January 19, 1976, memorandum and by Mr. Chapman in his February 27, 1976, testimony.

In January 1976, the NRC began a special review of safeguards focusing on licensees who possess significant quantities of highly enriched uranium or plutonium. Onsite evaluations were made to assess the effectiveness of programs approved and implemented to meet current regulations and to judge safeguards capabilities against postulated threat levels. The capabilities of 13 licensees (involving 15 facilities) were examined. Although there are no specific threat levels defined in our regulations, the threat levels used for this review consisted of an internal threat of at least one employee occupying any position and an external threat comprised, at a minimum, of three well-armed, well-trained persons, who might possess inside knowledge or assistance. Licensee safeguards capabilities were expected to defeat this threat with high confidence.

This special review focused on fuel cycle facilities possessing strategic quantities of special nuclear materials. For safeguards purposes, this is defined as at least two kilograms of plutonium or five kilograms of uranium-235 (contained in uranium enriched to more than 20 percent in the U-235 isotope).

Weaknesses relative to the threat levels used in this review were found at each of the 15 facilities. The most prevalent weaknesses related to control of access to significant quantities of special nuclear material (both stored and in process), exit search procedures, and adequacy of response by onsite and offsite forces. The review teams indicated that short-term fixes could correct most weaknesses and that some could be resolved by procedural changes alone. On the spot follow-up actions were initiated to correct weaknesses found.

During the initial review, guard forces of some licensees were judged inadequate because of their stated reluctance to engage an attacking force or because of their lack of strength in numbers. Since then, one licensee has significantly increased his guard strength, two others have hired more watchmen and all licensees have affirmed their commitment to intervene to protect strategic quantities of special nuclear material.

On the basis of a special survey by inspectors in the NRC Regional Offices, it has been determined subsequent to the review mentioned above that all licensees have made significant improvements in their safeguards systems. Of the 15 facilities involved in the safeguards review, eight facilities were judged to be adequate to withstand both the external and internal threats defined in the second paragraph of this letter. Of the remaining seven, one was judged adequate to protect against the external threat but not the internal threat, four were judged adequate to defend against the internal threat but not the external threat, and two were judged not adequate to protect against either threat with high confidence.

Correction of safeguards deficiencies by licensees is presently being accomplished by NRC staff using existing inspection, enforcement and licensing procedures.

Through the combination of voluntary licensee corrective actions and new license conditions, all fuel cycle licensees are expected to have the capability to withstand as a minimum the internal and external threats defined in the second paragraph of this letter by August 1976. To determine that this capability has been achieved, NRC assessment/evaluation teams will review again all fuel cycle facility safeguards measures onsite during August-September 1976.

In a separate series of reviews, the NRC staff has been analyzing the vulnerability of road shipments of strategic quantities of special nuclear materials to attack by one internal and three external adversaries having military training and skills. These reviews, conducted with industry cooperation and assistance from U.S. Army Special Forces teams have already led to improvements in commercial transportation planning and scheduling and in the training of drivers and guards. Furthermore, based upon these reviews, the NRC staff has implemented new license conditions requiring increased protection for strategic quantities of special nuclear material in transport.

Nuclear reactor facilities were not included in the safeguards reviews discussed above. However, special physical security inspections have

een conducted during the period February-May 1976. These inspections ndicate that guard forces at certain reactor-sites have recently been pgraded in anticipation of a pending amendment to the reactor safeuards regulations.

/ith regard to civil penalties associated with safeguards activities, he first penalty for noncompliance was assessed in August 1974. Since hen, safeguards civil penalties have been assessed against 14 licensees nd three are presently pending. Only one licensee has received two ivil penalties for noncompliance with safeguards regulations.

n reply to your questions concerning the utility of monetary civil enalties, it should be noted that civil penalties are only one of everal sanctions utilized in our enforcement program. In addition to ivil penalties, the NRC has authority to modify, suspend, or revoke icenses. In general, these sanctions are considered to be more severe han civil penalties, although the ranking is not a clear-cut one. In erms of impact on a licensee, we generally consider that the most evere sanction is that of revocation of the license, thus denying the irm the ability to perform the activity subject to the license. The election of which enforcement sanction to be applied in a particular ase is one of the responsibilities that the NRC must discharge. All of he various enforcement sanctions available to the NRC have been used in he past and, as necessary, they will be used in the future to obtain eeded corrective action.

he NRC Staff is initiating a study to examine, in more detail, the ffectiveness of the various enforcement sanctions available to it. This tudy is expected to be completed before the end of this year.

hope this letter has clarified these nuclear safeguards matters for ou. Please let me know if the Commission can be of further assistance o your Subcommittee.

Sincerely,

Marcus A. Rowden

Marcus A. Rowden
Chairman

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NINETY-FOURTH CONGRESS

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COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

CHARLES CONKLIN
STAFF DIRECTOR
LEE MC ELVAIN
GENERAL COUNSEL
MICHAEL C. MARDEN
MINORITY COUNSEL

August 11, 1976

The Honorable
Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear ~~Mr. Rowden~~ Marc:

In your letter of July 20, 1976 concerning security at NRC licensed facilities, you stated that, "Through the combination of voluntary licensee corrective actions and license conditions, all fuel cycle licensees are expected to have the capability to withstand as a minimum the internal and external threats defined in the second paragraph of this letter by August, 1976."

I would appreciate your indicating what new license conditions have been imposed and the date of imposition. In a May 5, 1976 letter to Mr. Tsongas, Mr. Gossick stated that the NRC considers the likelihood of sabotage to be equal to the likelihood of theft. In view of this, does the NRC intend to impose such new license conditions upon reactors?

Thank you for your assistance.

Sincerely,

Mo

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

Enjoyed our visit!
M.U.

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

September 2, 1976

The Honorable
Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Marc:

Your letter of July 20 concerning security in the domestic nuclear industry states that NRC will review fuel cycle facility safeguards in August and September to determine whether a capability has been achieved to withstand minimum threats as defined in the second paragraph of your letter. I would appreciate your providing me the conclusions of this review as soon as they are available.

I continue to be puzzled by certain questions concerning the level of threat which the NRC believes must be the basis for planning security systems. It is not clear, for example, whether the design threat described in your letter of July 20 (e.g. three well-trained, well-armed persons) is equivalent to the threat described by Mr. Gossick in his May 5 letter to Representative Tsongas (e.g. a group consisting of skilled persons who might be equipped with machine guns, plastic explosives, anti-tank weapons, etc.).

There are similar questions about the threat against which reactors need be protected. In Mr. Gossick's May 5 letter, no distinction is made between the threat posed to reactors where sabotage is the major concern, and that posed to fuel cycle facilities where theft of nuclear materials is the dominant concern. Nor does your July 20 letter address this matter directly.

The Honorable
Marcus A. Rowden

September 2, 1976

To clarify these matters I hope that you might indicate the following:

1. Whether the NRC continues to believe it prudent to assume threatening groups might possess resources, expertise and capabilities stated in Mr. Gossick's letter of May 5.

2. Whether NRC believes reactors need be protected against threatening groups with abilities and resources described in the May 5 letter, and, if not, what threat is used as the basis for design of reactor security systems.

3. Whether existing reactor security systems (including plant design features) are adequate to protect against the range of sabotage threats the NRC believes plausible.

Thank you for your assistance.

Sincerely,

Mo Udall

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

Response to September 2, 1976 letter

not received as of date of printing.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE CHAIRMAN

September 23, 1976

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and Insular Affairs
United States House of Representatives
Washington, D. C. 20515

Dear Mr. Chairman:

Your letter of August 11, 1976 requested information concerning the imposition of safeguards license conditions at certain NRC licensed facilities.

My July 20 letter to you noted that the special review of safeguards identified seven facilities which were judged unable to meet the postulated threat levels consisting of an internal threat of at least one employee occupying any position or an external threat comprised, at a minimum, of three well-armed, well-trained persons, who might possess inside knowledge or assistance. One facility has since reduced its licensed material possession limit to less than a strategic quantity of divertible SNM. The safeguarding of strategic material in the remaining six facilities has been strengthened by requiring compliance with a number of new license conditions.

In each case certain license conditions were imposed by letter order to assure the immediate accomplishment of those actions considered necessary to meet the defined threat. The security posture was then further enhanced by the issuance of a number of additional license conditions following discussion regarding them between members of the NRC staff and licensee personnel. In general, the thrust of these license conditions can be characterized as pointing to better controls over material and personnel, improved offsite communications to local law enforcement agencies, more effective search procedures and an increase in guard force personnel as necessary. Letters transmitting the conditions were sent during the period from June 29 to August 20, 1976. Enclosed is a summary of the new license conditions for each of the six facilities.

Actions are also being taken to assure an adequate level of physical protection of reactor facilities .Special physical security inspections were made by NRC of all nuclear power reactors starting in February, 1976 in order to determine the effectiveness of existing security provisions. As a result, in July, nine reactor sites were identified where immediate upgrading was considered by NRC to be desirable. This upgrading is being accomplished through voluntary licensee corrective actions. Specific examples of the actions taken by the licensees include increased frequency of security patrols, posting of additional guards, contacts with local law enforcement agencies to reaffirm established liaison and, in some cases, immediate upgrading of physical barriers. In addition, most of the licensees initiated procurement actions for additional equipment for upgrading their physical security systems, including closed circuit TV, perimeter alarms, and interior intrusion alarms. Amendments to NRC regulations, presently in the final stages of preparation, will codify the physical protection measures for nuclear power reactors now being required on an individual case basis .

I greatly appreciate your interest in the important area of safeguards. Please do not hesitate to contact me if any further information is desired.

Sincerely,

Marcus A. Rowden

Marcus A. Rowden
Chairman

Enclosure:
Summary of New License Conditions

I very much valued our meeting and productive discussion and look forward to a continuing dialogue.

Marc R.

SUMMARY OF NEW LICENSE CONDITIONS ISSUED TO UPGRADE EXISTING SAFEGUARDS AT FUEL CYCLE FACILITIES

Facility	Date of Issuance of License Amendments	Summary of New License Conditions
1. Babcock & Wilcox, Apollo, Pennsylvania, License No. SNM-145	June 29, 1976	- Established additional requirements for access to protected areas and for improved entry/exit point searches and control.
		- Established additional requirements for confirming adherence to the two-man rule.
		- Established new requirements for security monitoring equipment for operation, testing and calibration.
		- Established additional requirements for use and control of emergency exits.
		- Established additional requirements for installation of additional interior and intrusion alarm systems.
		- Established new requirements for the maintenance of security equipment.
		- Established procedures to prevent diversion of SNM during emergency or drill evacuation.
		- Established additional procedure for storage and packaging requirements, including preparation for shipment.
	August 11, 1976	- Established detailed procedures which shall be implemented in the event of a failure of the intrusion alarm system.

Facility	Date of Issuance of License Amendments	Summary of New License Conditions
1. Babcock & Wilcox, Apollo, Pennsylvania, License No. SNM-145		- Established requirements for storage of in-process high enriched uranium (HEU). - Established improved offsite communication system.
2. Texas Instruments, Attleboro, Massachusetts License No. SNM-23	August 11, 1976	- Established requirements for area monitoring. - Established requirements for certain space alarms for unoccupied areas. - Established requirements for improved offsite communications. - Established armed response capability requirements.
	August 20, 1976	- Established additional requirements for access control. - Established requirement for improved organizational structure for physical security program. - Established new requirements for accomplishing entry and exit searches. - Established additional requirements for intrusion alarm systems. - Established procedures and practices relative to storage, issuance and use of tamper seals. - Established improved procedures for contacting local law enforcement agencies. - Established procedures for control and use of emergency exits.

Facility	Date of Issuance of License Amendments	Summary of New License Conditions
2. Texas Instruments, Attleboro, Massachusetts, License No. SNM-23		- Established requirement for guards to be more explicitly instructed in scope of their responsibilities in protecting SNM.
		- Established requirements for more stringent surveillance of individuals in certain areas.
3. U. S. Nuclear, Inc., Oak Ridge, Tennessee, License No. SNM-1315	August 11, 1976	- Established new requirements for the security communications system.
		- Established additional armed response capabilities.
	August 20, 1976	- Established new requirements for protection of HEU in process.
		- Established requirements for physical modification to the entry and exit arrangements and new requirements for entry/exit point searches.
		- Established new requirements relative to storage, issuance and use of tamper seals.
		- Established new requirements for protection, operation and maintenance of primary and secondary alarm stations and alarm systems.
		- Established requirements for increased liaison and improved communication with local law enforcement agencies.
		- Established procedures for use of and control of emergency exits.
		- Established requirement for guards to be more explicitly instructed in scope of their responsiblities in protecting SNM.

Facility	Date of Issuance of License Amendments	Summary of New License Conditions
3. U. S. Nuclear, Inc., Oak Ridge, Tennessee, License No. SNM-1315		- Established additional procedures to ensure effectiveness of two-man rule.
4. United Nuclear Corp., Uncasville, Connecticut, License No. SNM-368	August 11, 1976	- Established requirement for guards to be more explicitly instructed in scope of their responsibilities in protecting SNM.
		- Established requirements for modification to primary control alarm station.
		- Established new requirements for the storage of certain special nuclear material.
	August 20, 1976	- Established new requirements for protection of certain special nuclear material during storage.
		- Established requirements to improve the effectiveness of the two-man rule in several areas.
		- Established additional entry and exit point search requirements
		- Established requirements for improved protection of opening leading to material access areas.
		- Established procedures relative to storage, issuance and use of tamper seals.
		- Established requirements for improved liaison and communication with local law enforcement agencies.
		- Established time requirement for response to material access area intrusion alarm.

Facility	Date of Issuance of License Amendments	Summary of New License Conditions
4. United Nuclear Corp., Uncasville, Connecticut, License No. SNM-368		- Established requirement for control of and use of emergency exits.
		- Established requirements to improve the effectiveness of the intrusion alarm systems.
5. United Nuclear Corp., Wood River Junction, Rhode Island, License No. SNM-777	August 11, 1976	- Established new response capability.
		- Established additional exit/entry search requirements.
		- Established requirement for redundant voice communication with local law enforcement agencies.
	August 20, 1976	- Established new requirements for operation, testing and maintenance of intrusion alarm systems.
		- Established new requirements for monitoring storage areas.
		- Established additional requirements to improve effectiveness of two-man rule.
		- Established additional requirements for entry/exit point searches.
		- Established additional requirements for storage, issuance and use of tamper seals.
		- Established additional requirements for the use of and control of emergency exits.
		- Established additional requirements for protection of HEU in process.

Facility	Date of Issuance of License Amendments	Summary of New License Conditions
5. United Nuclear Corp., Wood River Junction, Rhode Island, License No. SNM-777		- Established a requirement to increase the protection of sensitive security information following termination of employees with specific knowledge of the security system.
		- Established new requirements for increased guard force strength and effectiveness.
		- Established requirement for improved liaison with local law enforcement agencies.
		- Established requirement for guards to be more explicitly instructed in scope of their responsibilities in protecting SNM.
6. Westinghouse Electric Corp., Pittsburgh, Pennsylvania, License No. SNM-1120	August 11, 1976	- Established additional communication capability requirements with local law enforcement agencies.
		- Established additional primary central alarm station requirements.
		- Established minimum guard force requirements and response capability.
	August 20, 1976	- Established additional requirements to improve the liaison with the local law enforcement agencies.
		- Established requirement for guards to be more explicitly instructed in scope of their responsibilities in protecting SNM.
		- Established a requirement to increase the protection of sensitive security information following termination of employees with specific knowledge of the security system.

Facility	Date of Issuance of License Amendments	Summary of New License Conditions
6. Westinghouse Electric Corp., Pittsburgh, Pennsylvania, License No. SNM-1120		- Established additional primary central alarm station and alarm systems requirements. - Established additional requirements for maintenance and testing of alarm systems. - Established procedures for control of and use of emergency exits. - Established procedures for the storage, issuance and use of tamper seals. - Established additional requirements for exit/entry searches. - Established additional requirements to improve the effectiveness of the two-man rule. - Established additional requirements for on-site guard strength and off-site local law enforcement agencies reinforcements. - Established requirements for guard force strength capability.

Enclosure to Udall letter dated September 23, 1976

VII. Inadequacy of Response to Subcommittee Requests

Facility	Date of Issuance of License Amendments	Summary of New License Conditions
6. Westinghouse Electric Corp., Pittsburgh, Pennsylvania, License No. SNM-1120		- Established additional primary central alarm station and alarm systems requirements. - Established additional requirements for maintenance and testing of alarm systems. - Established procedures for control of and use of emergency exits. - Established procedures for the storage, issuance and use of tamper seals. - Established additional requirements for exit/entry searches. - Established additional requirements to improve the effectiveness of the two-man rule. - Established additional requirements for on-site guard strength and off-site local law enforcement agencies reinforcements. - Established requirements for guard force strength capability.

Enclosure to Udall letter dated September 23, 1976

VII. Inadequacy of Response to Subcommittee Requests

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

March 12, 1976

COPY

Mr. William Anders
Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Chairman:

As you know, the House Interior and Insular Affairs Committee Subcommittee on Energy and the Environment has oversight responsibilities with regard to civilian applications of nuclear energy. In my capacity as Subcommittee Chairman, I have requested from the NRC information on a series of matters. Requests for information were made in letters dated January 9, January 16, January 23, February 3 and February 17.

In each instance, the requested information was of a nature that should have been of interest to the Commission itself and therefore should have been readily available. Yet as of this date, not one request has been fulfilled. This raises serious doubt concerning the thoroughness with which the Commission is fulfilling responsibilities assigned it by Congress.

Previously, I have noted my belief that a *sine qua non* of a viable nuclear industry is a regulatory process in which the public and Congress have confidence. A failure of the NRC to be responsive to Congressional inquires diminishes the possibilities for development of the necessary degree of trust.

I am, of course, aware of the many demands placed upon the Commission's resources. Nevertheless, this in no way excuses

Mr. William Anders March 12, 1976

failure to respond to requests of this Subcommittee, of its Chairman, or of other Members of Congress. I await an early explanation for the delays.

Sincerely,

Morris K. Udall
Chairman, Subcommittee on
Energy and the Environment

79-679 O - 76 - 10

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

March 16, 1976

Honorable Morris K. Udall, Chairman
Subcommittee on Energy and the Environment
Committee on Interior and Insular Affairs
U. S. House of Representatives

Dear Chairman Udall:

Chairman Anders has asked me to reply to your letter of March 12, 1976 in which you expressed concern about the Nuclear Regulatory Commission's delays in responding to your correspondence of the last two months.

Answers to your five letters are either in the mail or in the last stages of preparation and review. You should be receiving them soon. I trust that you will find our replies fully responsive to your inquiries.

We sincerely regret the delay in our responses. Several of your letters requested detailed statistical information which required some time to collect. All raised matters with broad policy implications, matters to which each of the Commissioners has wished to give his personal attention in fashioning agency responses.

Regretably, in these instances the Commission's desire to be thorough in all of its responses to Congressional inquiries came into conflict with the need for prompt, expeditious handling.

Each of the Commissioners has been made aware of your concern that NRC's failure to respond promptly to Congressional inquiries makes more difficult the development of the degree of trust in the regulatory process which you describe as a "sine qua non of a viable nuclear industry". Please be assured that our office will make every effort to assure that similar delays will not occur in the future.

Sincerely,

Carlton Kammerer

Carlton Kammerer, Director
Office of Congressional Affairs

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE CHAIRMAN

APR 2 1976

Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and Insular Affairs
U.S. House of Representatives

Dear Chairman Udall:

In response to your letter of March 12, 1976 regarding information you had previously requested, I want to personally assure you that the Commission is fully aware of the necessity to keep Congress informed on matters within the jurisdiction of the Nuclear Regulatory Commission. We are always mindful of the responsibilities and concerns of Congress, its members and committees. The NRC is wholly committed to a policy of openness in the regulatory process and in all aspects of nuclear safety. Indeed, our responses to your inquiries have taken longer than we normally require to do a good and thorough job.

Carlton Kammerer, the Director of the NRC's Office of Congressional Affairs, has already explained to you and to your staff the reasons for the delay in our replies, but there are other facts, of which you are perhaps not aware, that I would like to call to your attention. During the period of preparation of our responses, a major issue was raised concerning the health of the regulatory process and the adequacy of past safety decisions. Formulating a point-by-point response was given high priority in preparation for scheduled hearings before the JCAE. Our Executive Director for Operations, Mr. Gossick, estimates that over 20,000 staff man-hours went into NRC's preparations for these recent hearings. Additionally, during the three-month period from December 15, 1975 through March 15, 1976, the NRC received 424 letters from the public plus 208 Congressional letters. While a large number of these could be quickly answered, many required the preparation of detailed appendices and policy review by the Commissioners.

Among those letters were nine letters from you which posed a total of 23 questions, each of which required detailed response and gathering of data and documents. I realize the professional responsibility you feel and the personal interest you have in matters of this kind. I am concerned, however, that you may not be fully aware of the substantial staff time which thorough preparation of responses entails.

An internal examination indicates that the NRC staff has devoted an actual total of 298 hours of staff time to gather the data to respond effectively to those nine letters--at a cost of over $2,870. Your letter of January 9 alone, regarding inventory discrepancies at the Nuclear Fuel Services Erwin plant required 109 hours of staff time to gather the data and prepare a response. Another 64 hours of staff time were required to prepare the response to your letter of January 16 regarding the export of research reactor and HTGR fuel.

Moreover, during the same period of time in which these detailed responses to your letters were being prepared, the same personnel were also called upon to prepare the NRC submissions for the safeguards hearings held before the House Committee on Interior and Insular Affairs on February 26 and 27. An additional 230 hours of staff time was involved in this preparation at a cost of over $2,210. All of this, of course, is part of our job, but I want to illustrate to you that we were dedicating significant amounts of resources to the effort to respond fully and in detail to your requests and that a well-researched reply takes time, particularly where the same staff may be handling preparation of several items.

I accept the point that our responses to your recent series of requests have not been as rapid as they might have been under more normal circumstances, but I must admit to being greatly disheartened personally at the issuance from your office of a press release publicly castigating the NRC for failing to reply to your letters only two days after the date of your letter to us inquiring about the status of our correspondence. I am particularly concerned over this incident since the NRC staff had been in close touch with your staff regarding the preparation of the responses to your letters. Several phone calls had been made to your staff to apprise them of the status of the replies, and your March 12 letter prompted further such calls and a letter from us assuring you of our interest in and effort to meet your needs. Given these assurances, I am at a loss to comprehend the purpose of your press release.

We at the NRC take our responsibilities to Congress most seriously. I believe the degree of our commitment to be fully responsive is evidenced by the conscientious manner in which all of our responses to Congress have been prepared.

We regret the length of time involved in some of our responses to Congress, and we are working to improve our internal process. However, we believe that these apparent delays are understandable given both the nature and volume of the issues raised and inquiries we received in that same time period and the commitment to quality and completeness to which the Commission adheres. In the future we will undertake to assure that you personally are kept currently informed of the status of your inquiries in an effort to avoid further misunderstandings.

Sincerely,

William A. Anders
Chairman

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

April 15, 1976

COPY

Mr. William Anders, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Anders:

This is in response to your April 2 letter discussing costs and explaining delays related to fulfilling Subcommittee requests for information. I want to emphasize that such requests do not flow from idle curiosity; rather, they arise in consequence of the nuclear oversight role assigned by the House of Representatives to the Subcommittee on Energy and the Environment.

My letter of March 12, to which your April 2 letter refers, expressed concern that responses had not been received to five letters I had sent to the NRC in the period January 9 through February 17. The lack of response indicated that the NRC did not possess important information relevant to exercise of its regulatory role. The March 12 letter was made available to the press since fulfillment of the Subcommittee's oversight responsibilities requires release of information suggesting the NRC is not performing missions assigned it by the Congress.

I am surprised that it should take a total of 298 hours of effort to compile responses to the nine letters you received from me in the period December 15, 1975 through March 15, 1976. Of the nine letters, three were administrative: one asked that a Subcommittee staff person's security clearance be kept active; one invited your staff to present testimony at a hearing; and one was the letter of March 12 requesting an explanation for the delay in answering five substantive letters. The following specific comments apply to the latter:

-- The NRC response to my letter concerning material accounting problems at Erwin contains two pages in answer to my questions. This information should have been of vital interest to the NRC as it carried out its investigations of the Erwin situation. Therefore I do not understand how preparation of this response could have required 109 hours of staff time in addition to that which would have been necessary in the absence of my inquiry.

-- My letter asking about exported highly enriched uranium raises another issue to which the NRC should have assigned a high priority. While we have yet to receive a complete answer concerning the whereabouts of exported weapons grade uranium, I believe that the information now in hand shows a manifest need for immediate improvement in procedures for monitoring the location of exported material of this kind.

-- My letter of February 3 asked for information concerning Commission procedures. While it is still not clear how extensive are the minutes of Commission transactions, I assume that this will be clarified when you furnish the information I requested on March 25.

I have noted your estimates of costs incurred in responding to my inquiries. These estimates show such costs are small when viewed in the context of the need for the Subcommittee and, I assume, the NRC to have the information necessary to fulfill our respective responsibilities. I also note that these costs are but a small fraction of the total NRC expenditure on providing information to the Congress and the public.

Thank you for your cooperation.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

VIII. Plutonium Exports

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

March 19, 1976

COPY

Mr. William Anders, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Anders:

There is considerable confusion with regard to the amount of plutonium which is currently involved in commerce associated with non-military applications of nuclear energy. One element of the confusion concerns the quantities of plutonium which have been and are being fabricated into fuel elements for use in reactors outside the United States.

I would appreciate your providing information which indicates, for the period January 1, 1975 through the present, the number of international shipments to and from fuel fabrication facilities in the United States, the countries of origin and destination of these shipments, and the amount of material involved in each shipment. Please also indicate the mode of transportation.

Thank you for your assistance.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

March 31, 1976

Honorable Morris K. Udall
Chairman
Subcommittee on Energy and the Environment
Committee on Interior and Insular Affairs
U. S. House of Representatives

Dear Chairman Udall:

Chairman Anders has asked me to acknowledge your letter of March 19, concerning the amount of plutonium fabricated into fuel elements for use in reactors outside the United States.

As Mr. Myers of your Subcommittee staff has been advised, some of this information is not readily available and must be retrieved from the Technical Information Center in Oakridge, Tennessee.

Please be assured that our response to your request will be forthcoming as soon as this information becomes available to us and can be analysed by NRC staff.

Sincerely,

Carlton Kammerer

Carlton Kammerer, Director
Office of Congressional Affairs

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE CHAIRMAN

April 27, 1976

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and Insular Affairs
United States House of Representatives
Washington, D. C. 20515

Dear Chairman Udall:

This is in response to your letter of March 19, 1976, in which you requested information on international shipments of plutonium to and from fuel fabrication facilities in the United States.

During the period January 1, 1975 to March 26, 1976, the only fuel fabrication facility in the United States that received international shipments of plutonium was the Westinghouse Electric Corporation Plutonium Fuel Development Laboratory (PFDL), Cheswick, Pennsylvania. The Cheswick facility received two shipments of plutonium from Belgium in the form of oxide and exported one shipment of fuel rods containing mixed oxide fuel to Italy. The information requested on these shipments is enclosed.

For your information, the plutonium Westinghouse imported from Belgium was obtained from Italian spent fuel elements which were reprocessed in Europe and is the same material used in the fabrication of the fuel rods subsequently exported to Italy. Included in the manufacture of the fuel rods were 45.130 kilograms of plutonium previously imported from Belgium in July 1974. This 1974 import was transported by air, the same as for the February 1975 shipment.

I hope you will find this information responsive to your request. Please let us know if we can be of further assistance.

Sincerely,

Marcus A. Rowden
Marcus A. Rowden
Chairman

Enclosure:
As stated

ENCLOSURE

SHIPMENTS TO WESTINGHOUSE PFDL

Date Received	Origin	Shipment Mode	Amount
Feb. 25, 1975	Belgium	Airline & Truck	48.077 kilograms
June 3, 1975	Belgium	Surface Ship & Truck	42.915 kilograms

SHIPMENT FROM WESTINGHOUSE PFDL

Date Shipped	Destination	Shipment Mode	Amount
Nov. 17, 1975	Italy	Surface ship & trucks	125.493 kilograms

IX. Questions Pertaining to Domestic Safeguards Hearings

NINETY-FOURTH CONGRESS

JAMES A. HALEY, FLA., CHAIRMAN

ROY A. TAYLOR, N.C.
HAROLD T. JOHNSON, CALIF.
MORRIS K. UDALL, ARIZ.
PHILLIP BURTON, CALIF.
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PATSY T. MINK, HAWAII
LLOYD MEEDS, WASH.
ABRAHAM KAZEN, JR., TEX.
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JOSEPH P. VIGORITO, PA.
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TENO RONCALIO, WYO.
JONATHAN B. BINGHAM, N.Y.
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BOB ECKHARDT, TEX.
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JAIME BENITEZ, P.R.
JIM SANTINI, NEV.
PAUL E. TSONGAS, MASS.
ALLAN T. HOWE, UTAH
JAMES WEAVER, OREG.
BOB CARR, MICH.
GEORGE MILLER, CALIF.
THEODORE M. (TED) RISENHOOVER, OKLA.
WRIGHT PATMAN, TEX.

JOE SKUBITZ, KANS.
SAM STEIGER, ARIZ.
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PHILIP E. RUPPE, MICH.
MANUEL LUJAN, JR., N. MEX.
KEITH G. SEBELIUS, KANS.
ALAN STEELMAN, TEX.
DON YOUNG, ALASKA
ROBERT E. BAUMAN, MD.
STEVEN D. SYMMS, IDAHO
JAMES P. (JIM) JOHNSON, COLO.
ROBERT J. LAGOMARSINO, CALIF.
VIRGINIA SMITH, NEBR.
SHIRLEY N. PETTIS, CALIF.

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

CHARLES CONKLIN
STAFF DIRECTOR

LEE MC ELVAIN
GENERAL COUNSEL

MICHAEL C. MARDEN
MINORITY COUNSEL

March 18, 1976

COPY

Mr. William A. Anders, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Anders:

At recent hearings held by the House Interior and Insular Affairs Committee Subcommittee on Energy and the Environment, the NRC staff agreed to furnish additional information on certain of the matters which came under discussion. There was also insufficient time to pursue a series of questions which the Subcommittee believes should be addressed. I would, therefore, appreciate your providing answers to the questions presented on the attached pages.

I recognize that while the answers to certain of these questions can be readily obtained, answers to others will require more extensive research. Therefore, I would appreciate your providing us as soon as possible a schedule in accordance with which responses will be made to the Subcommittee.

Sincerely,

Paul E. Tsongas

1. How does NRC rate the likelihood of sabotage vis-a-vis theft?

2. How does NRC rate the likelihood of a group gaining access to a facility by assault vis-a-vis gaining entry by subtrafuge, by use of hostages, by inside assistance?

3. What does NRC consider the greatest threat: terrorists (foreign or domestic), organized crime, criminals bent on extortion, psychotics?

4. What kinds of resources, expertise, and capabilities are assumed to be possessed by threatening persons or groups?

5. What is the NRC position regarding the plausibility of the threats specified in the MITRE threat analysis? Does the NRC believe, for example, that it is necessary to protect nuclear power plants from sabotage by conspiracies planned and/or supported by foreign powers such as the Soviet Union, China or Cuba?

6. What is the NRC policy regarding classification of safeguards information? What assumptions underlay this policy? How was it arrived at?

7. What did Mr. Builder mean in his memorandum when he wrote that he, "was concerned that some or even many of currently licensed facilities may not have safeguards which are adequate against the lowest levels of design threat. . ." being considered by the NRC?

8. In answering a question with regard to the memorandum in which he expressed his concern about the adequacy of existing safeguards, Mr. Builder noted that he was alerting the Safeguards Division to the existence of new analytical tools. What are those tools and what insights did they provide which enabled Mr. Builder to make a judgement which he had not previously been able to make; e.g. that, ". . .currently licensed facilities may not have safeguards which are adequate against the lowest levels of design threat we are considering in GESMO."?

9. In his testimony, Mr. Pollard suggested that some reactors were particularly vulnerable to sabotage. What steps are being taken to determine whether Mr. Pollard's allegations in this area have merit? To the extent that such vulnerabilities do exist, what steps are being taken to eliminate them?

10. When did the NRC first learn of material accounting problems at Erwin, Tennessee? What steps were taken to remedy these deficiencies? On what date were these steps taken? When and

how did NRC learn that there was an honor system in effect to detect theft of uranium at Erwin? What did NRC do, and on what date did the NRC take steps to replace the honor system with more thorough protective measures? What confidence is there that material has not been stolen from this facility?

11. Is NRC aware of any long standing problems in accounting for material at the Erwin scrap recovery facility? The Subcommittee has received information to the effect that no one knows how much scrap U-235 has been shipped from Erwin to the burial ground at Mound, Kentucky. Is there validity to this report? Is NRC aware of an incident where labelling on barrels containing scrap was washed off with the result that a substantial uncertainty was introduced concerning the amount of material sent to the burial ground?

12. What does the Erwin experience indicate with regard to the ability to account for nuclear materials?

13. How accurate does NRC expect nuclear material accounting systems to be?

14. What is the role of material accounting systems in the overall safeguards system?

15. Is the safeguards system at Erwin capable of providing protection against the threats being considered in the NRC safeguards studies?

16. There have been reports of possible fraudulent manipulation of records at Erwin, Tennessee. Does the NRC have a special group for detecting such fraud? If so, what is the experience of the members of this group? What is the FBI's responsibility? At what point would the FBI be called in?

17. We have received a report that workers at Erwin, Tennessee could have removed highly enriched uranium through an alarmed but unguarded side door and have left the premises before the guard at the gate could do anything about it? Is this report accurate? How long did this situation exist? When was it discovered? What remedial steps were taken and on what date?

18. Mr. Chapman testified that calculations indicated that sabotage of spent fuel would not lead to an ". . .extreme hazard outside the immediate vicinity of where the event might occur." Please provide the calculations which lead to this conclusion.

19. During the hearing a Subcommittee member expressed concern that fines levied for violation of safeguards regulations were insufficient to constitute a real deterrent. In response to this expression of concern Mr. Case said:

> "The real penalty (for violation of safeguards regulations) is the public notoriety and the public pressure. That is one of the things that results from NRC imposing these fines, a lot of newspaper publicity, and that by far is a more expensive penalty on the company."

Does the NRC agree with Mr. Case that the prime deterrent against these violations is the prospect of adverse publicity? Enumerate fines levied as a consequence of safeguards violations since establishment of NRC. What is the rationale for setting fines at these levels?

79-679 O - 76 - 11

Central File
Incoming
3/18/76.
Hearings)

Honorable Paul E. Tsongas
Subcommittee on Energy and the
Environment
Committee on Interior and
Insular Affairs
U.S. House of Representatives

Dear Mr. Tsongas:

This is in response to your letter of March 18, 1976, in which you requested answers to nineteen questions related to the recent hearings held by the House Interior and Insular Affairs Subcommittee. We plan to submit our response to you no later than May 7, 1976.

Sincerely,

(Signed) William J. Dircks

for Lee V. Gossick
Executive Director

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

May 5, 1976

Honorable Paul E. Tsongas
Subcommittee on Energy and the Environment
Committee on Interior and Insular Affairs
U. S. House of Representatives

Dear Mr. Tsongas:

In your letter of March 18, 1976, you requested the Nuclear Regulatory Commission to provide answers to nineteen questions related to the recent hearings held by the House Interior and Insular Affairs Subcommittee. The Commission is pleased to provide the requested information which is enclosed.

We trust that the additional information will satisfactorily answer the Subcommittee's questions.

Sincerely,

Lee V. Gossick
Executive Director for Operations

Enclosure:
NRC Response to Questions
from the House Interior and
Insular Affairs Committee

NRC RESPONSE TO QUESTIONS
FROM THE HOUSE INTERIOR AND INSULAR AFFAIRS
COMMITTEE, SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT

1. How does NRC rate the likelihood of sabotage, vis-a-vis theft?

RESPONSE:

There are no objective means for assessing the relative likelihood of sabotage versus theft. Adversary motivation, objectives, and tactics would be significantly different for either act, but current NRC safeguards regulations are designed to prevent both successful theft and a successful sabotage. In addition, NRC is continually evaluating and, where necessary, strengthening safeguards to meet changing requirements. In the analysis of current or future requirements, either event (sabotage or theft) is assumed equally likely.

2. How does NRC rate the likelihood of a group gaining access to a facility by assault vis-a-vis gaining entry by subterfuge? By use of hostages? By inside assistance?

RESPONSE:

Assessment of the likelihood of a group gaining access to a facility by one method or another is a very difficult and subjective problem, being highly dependent on the type and size of assault vis-a-vis the type and subtlety of the subterfuge, etc. With regard to assault, subterfuge, or inside assistance, current safeguards provide a relatively balanced deterrent against each act. In the case of hostages, however, some unique problems exist and these problems are being examined at the present time.

In accordance with PL 93-438, NRC is "developing...contingency plans for dealing with threats, thefts, and sabotage relating to special nuclear materials, high-level radioactive wastes, and nuclear facilities....". These safeguards contingency plans are based on the assumption that any of the above actions (plus many others) are possible.

3. What does NRC consider the greatest threat? Terrorists (foreign or domestic)? Organized crime? Criminals bent on extortion? Psychotics?

RESPONSE:

There is no information available to NRC which indicates that any group is planning an act of theft or sabotage against the licensed nuclear industry at this time. Certainly, any of the above threats are capable of attempting to sabotage a facility or steal nuclear materials. Current

safeguards, as well as planned improvements, are based on the assumption that any of the above threats are possible. It is also important to realize that, although different groups exist which might pose a threat to nuclear facilities, there are only a limited number of general tactics available, e.g., armed assault, inside covert diversion (small amounts at a time) or theft, hurling explosives over a plant boundary, placing explosives inside the boundary, etc. NRC's approach is to safeguard against the possible modes of theft or sabotage instead of one or another specific groups, although continued study of terrorist groups is important to understanding possible specific tactics.

4. What kinds of resources, expertise, and capabilities are assumed to be possessed by threatening persons or groups?

RESPONSE:

NRC feels that it is possible that adversaries may possess any of the following:

EQUIPMENT

Semi-automatic pistols and rifles
Automatic pistols and rifles
Sub-machine guns
Shot guns
Hand grenades
Machine guns (up to 50 caliber)
Dynamite
Plastic explosives
Shaped charges
Citizen band radios
Two-way radios
General and special purpose vehicles
Aircraft (fixed-wing and helicopter)
Tear gas, MACE, etc.
* Light mortars
* Hand held air-defense weapons
* Light anti-tank weapons

* NOTE: While not as readily available as the other items, these are known to be available to terrorist groups.

INDIVIDUAL AND TEAM SKILLS

Nuclear materials identification and handling
Radiation monitoring and safety
Communications

Intelligence and security (reconnaissance, surveillance and alarm systems, etc.)
Tactical operations (combat experience)
Pioneer (demolition, structure and barrier breeching)
Transportation
Managerial

Terrorist groups (especially foreign) and organized crime are well known to have adequate resources to mount highly organized, well-planned, and extremely violent and disruptive acts. Therefore, NRC feels that it is prudent to assume that potential adversaries might possess any of the above described resources, expertise, and capabilities.

5. What is the NRC position regarding the plausibility of the threats specified in the MITRE threat analysis? Does the NRC believe, for example, that it is necessary to protect nuclear power plants from sabotage by conspiracies planned and/or supported by foreign powers such as the Soviet Union, China, or Cuba?

RESPONSE:

The following statement appears in the Conclusion of the MITRE study: "There is no possible, simple, numerical characterization of the threat to licensed facilities. ...The threat is intrinsically complicated, being linked to the ingenuity of the threatener." In fact, the MITRE study makes no mention of a set of specific threats, instead looking first at general vulnerabilities of licensed nuclear facilities to sabotage and theft (in general), and then speculating on the possibility that various groups (foreign and domestic) might pose a general threat against nuclear facilities.

Concerning the possibility of sabotage by foreign planned and/or supported conspiracies, NRC has developed and is continuing to improve a safeguards system designed to prevent the sabotage of nuclear facilities (or the theft or diversion of SNM) by any group regardless of their motives, political ties, etc. NRC's safeguards are based upon the presumption that continued civil order will exist in the United States, and, therefore, the safeguards measures which must exist in the public sector of our society will not be designed to repel armies, air strikes, or other actions normally associated with conventional warfare. NRC's safeguards are, however, designed to thwart highly sophisticated internally and externally mounted acts, regardless of the adversary group involved. These safeguards are being continually evaluated and improved as required.

6. What is the NRC policy regarding classification of safeguards information? What assumptions underlay this policy? How was it arrived at?

RESPONSE:

The NRC believes that certain sensitive safeguards information should be classified as National Security Information. Presently we are so classifying any report which discloses vulnerabilities of particular plants to theft or sabotage on the ground that the information bears directly on the effectiveness of our national defense and the conduct of our foreign relations, and requires restraint on disclosure in the interest of national security and the safety of our people, and to protect against actions hostile to the United States (see Executive Order 11652 of March 8, 1972 37FR5209). The decision to classify this information was dictated by the nature of the information and the requirements of the Executive Order.

We are also awaiting a decision of the National Security Council as to other types of sensitive safeguards information which may need to be classified. In the interim, we are withholding from public disclosure as proprietary data, under the provisions of 10 CFR 2.790(d) and 10 CFR 9.5(a)(4), all correspondence and reports to and from NRC which identify a licensee's or applicant's control and accounting procedures for safeguarding special nuclear material or detailed security measures for physical protection of a licensed facility.

7. What did Mr. Builder mean in his memorandum when he wrote that he, "was concerned that some or even many of currently licensed facilities may not have safeguards which are adequate against the lowest level of design threat..." being considered by the NRC?

RESPONSE:

Over the past year the NRC has had underway, through numerous avenues, a review of current safeguards regulations. This review has involved several major studies, extensive contacts with other federal agencies and individual experts, and nuclear facility visits. The purpose of this activity has been twofold: to judge the effectiveness of present safeguards arrangements, and to evaluate the merits of and need for new concepts in the future treatment of safeguards for special nuclear material. Mr. Builder's memorandum of January 19 reflects the development and examination of new conceptual approaches that would involve threat-specific criteria for the evaluation of safeguards. It served to place his staff on notice that threat-specific criteria might be utilized in the future for judging the adequacy of safeguards. Mr. Builder was expressing a concern in his memorandum that current safeguards systems at licensed facilities were not designed against specific threat criteria. Thus, Mr. Builder was expressing an analytical rather than an operational concern about the adequacy of current safeguards.

8. In answering a question with regard to the memorandum in which he expressed his concern about the adequacy of existing safeguards, Mr. Builder noted that he was alerting the Safeguards Division to the existence of new analytical tools. What are those tools and what insights did they provide which enabled Mr. Builder to make a judgement which he had not previously been able to make; e.g., that, "...currently licensed facilities may not have safeguards which are adequate against the lowest levels of design threat we are considering in GESMO."?

RESPONSE:

Mr. Builder was referring to the logic which has been found and the structures which have been assembled during the past year for viewing and defining the safeguards concern.

The application of system analysis techniques led to specific insights as to how safeguards problems can best be solved. For example, it is helpful to think of safeguards objectives in terms of sub-goals; preventing thefts, guarding against sabotage, assuring swift and adequate response to theft or sabotage, and providing timely information to the public.

Systematic approaches were developed to assess range of threats, levels of defense, and severity of consequences. After considerable analysis and debate, a body of safeguards policies is emerging which the staff believe to be logical, rational, and explainable. Examples of these general precepts are listed below.

- Safeguards should take into account the nature of material to be protected.

- Depending on the nature of material or sensitivity of the plant to be guarded, there may be at least three degrees of physical protection measures utilized: (1) defense with a very high degree of assurance, (2) protection with sufficient force to deter by imposing substantial and apparent risks, and (3) surveillance and notification of authorities.

- Accompanying physical protection systems should be material control systems to guard against covert diversion. Material control strategies can be considered in three categories; containment, access controls, and accounting systems.

- NRC and industry share the responsibility for assuring that adequate safeguards are applied to nuclear activities.

- U.S. safeguards controls must consider international policy.

In his memorandum, Mr. Builder was pointing out that the framework was at hand for assessing the adequacy of safeguards systems. In that regard, he expressed concern, that safeguards at some existing facilities may not be completely consistent with the new analytical frameworks and assessment criteria.

9. In his testimony, Mr. Pollard suggested that some reactors were particularly vulnerable to sabotage. What steps are being taken to determine whether Mr. Pollard's allegations in this area have merit? To the extent that such vulnerabilities do exist, what steps are being taken to eliminate them?

RESPONSE:

Mr. Pollard's allegations "that some reactors were particularly vulnerable to sabotage" appear to relate to the routing of electrical control and monitor wiring. The wiring paths start from sensing devices on reactor system components and typically lead through cable spreading areas to the control room. Cable spreading rooms are recognized as areas which are vulnerable to both fire and sabotage.

Although the layout of wiring in cable spreading rooms is such that the probability of a single detonating device succeeding in the disabling of all control and monitor systems is very low, multiple devices placed in carefully selected locations or widespread fire would be considered to have a somewhat greater chance of success. However, the disabling of all control circuits leading into a control room does not prevent the safe shutdown and cooldown of the reactor.

As a consequence of the Browns Ferry fire, the staff is re-examining all aspects of fire protection in cable spreading rooms, including fire detection and suppression systems. These provisions will also offer increased protection against certain kinds of potential acts of sabotage. In addition, cable spreading rooms are among those areas within a plant which are defined as vital areas, and as such, are subject to specific physical security requirements, e.g., doors to the area are normally locked and are equipped with alarms that annunciate in at least two places that are continuously manned so that surreptitious entry by unauthorized persons is unlikely to occur.

10. When did the NRC first learn of material accounting problems at Erwin, Tennessee? What steps were taken to remedy these deficiencies? On what date were these steps taken? When and how did NRC learn that there was an honor system in effect to detect theft of uranium at Erwin? What did NRC do, and on what date did the NRC take steps to replace the honor system with more thorough protective measures? What confidence is there that material has not been stolen from this facility?

RESPONSE:

NFS notified the NRC regional office of the accounting discrepancy on December 1, 1975. NFS agreed to shutdown the production and scrap processing plants for reinventory and investigation of the problems. The production plant was shutdown on December 1; the scrap recovery plant was

shutdown on December 18 after the scrap from the production plant was processed to a more amenable measurement form. During the reinventory period, NFS discovered plugged lines in an accountability tank in the scrap recovery plant. These plugged lines could have affected the representativeness of accountability samples, which, in turn, could have affected the physical inventory results for both plants. NRC inspectors were at the site to observe the reinventories, review the investigation results, and review the physical protection practices at the facility.

In March 1974, certain licensees, including NFS, were required to implement methods to search individuals exiting material access areas to assure that special nuclear material is not diverted. During an onsite visit January 13-15, 1976, an NRC Task Force noted that exit searches from material access areas were conducted on an honor basis. The licensee was informed verbally on January 23, 1976 and in writing on January 26, 1976 to station a watchman at each authorized exit point to assure that proper searches were conducted. Corrective action was promptly taken by NFS.

NRC has no evidence that special nuclear material has been stolen from NFS. With respect to overt attempts to steal special nuclear material, the NRC believes there were none, but there have been two cases where unauthorized entry was gained to protected areas. In those cases, the entries were promptly detected and the intruders did not attempt to penetrate interior protective barriers.

11. Is NRC aware of any long standing problems in accounting for material at the Erwin scrap recovery facility? The Subcommittee has received information to the effect that no one knows how much scrap U-235 has been shipped from Erwin to the burial ground at Mound, Kentucky. Is there validity to this report? Is NRC aware of an incident where labelling on barrels containing waste was washed off with the result that a substantial uncertainty was introduced concerning the amount of material sent to the burial ground?

RESPONSE:

In May 1974, new regulatory requirements for physical inventories and associated nuclear measurements became effective. The NRC staff is and has been aware that NFS has had difficulty in meeting the new requirements especially in the scrap recovery plant. Continued improvements in material control and accounting practices and physical security plans have been required of NFS and have been monitored by the NRC staff.

Prior to mid-1970, NFS was not required to report to the AEC the quantity of U-235 waste shipped to burial. They were, however, required to maintain records at the plant of such quantities. Since 1970, NFS has reported to the AEC (now NRC) the quantity of waste U-235 shipped to burial.

The NRC staff is not aware of an incident at NFS which resulted in substantial uncertainty about the amount of U-235 waste sent to burial due to labels being washed off drums. A waste drum may not be sent to burial until its U-235 content is measured and source documents have been generated and maintained by NFS.

12. What does the Erwin experience indicate with regard to the ability to account for nuclear materials?

RESPONSE:

The Erwin experience indicates that there continue to be basic and inherent limitations on the techniques for accurately accounting for special nuclear material. These limitations are caused by the uncertainties associated with the measurement of nuclear materials. Because of these measurement uncertainties, inventory discrepancies will continue to occur in nuclear operations, particularly in plants where chemical processing and scrap recovery are required. At the same time, however, the Erwin experience demonstrated that the accounting system can be an important means of detecting and identifying malfunctions in the control system for SNM. The need for designing prompt internal control systems to continuously track the location and movement of SNM through item control and the monitoring of in-process control parameters was indicated.

Finally, it is apparent that at the present time accounting systems cannot be depended upon exclusively to control nuclear materials. Physical security, access controls, and containment measures, in addition to accounting systems are required to assure protection of special nuclear material.

13. How accurate does NRC expect nuclear material accounting systems to be?

RESPONSE:

Capabilities to exactly account for special nuclear material are limited by the inherent measurement uncertainties associated with closing material balances. The following limits on measurement uncertainties for closing material balances at plants are specified by regulation:

	Throughput
Plutonium element or uranium-233 in a chemical reprocessing plant	1.0%
Uranium element and fissile isotope in a reprocessing plant	0.7%
Plutonium element, uranium-233, or high enriched uranium element and fissile isotope-all other	0.5%

Low enriched uranium element and fissile
isotope-all other 0.5%

Licensees are also required to establish and maintain systems of storage and internal handling controls to provide current knowledge of the identity, quantity, and location of all SNM contained within a plant in discrete items and containers. In addition, shipper-receiver evaluations are required on all SNM shipments. These programs should be capable of detecting a loss of a single item or container of material, or the diversion of a significant quantity of material from a series of containers.

14. What is the role of material accounting systems in the overall safeguards system?

RESPONSE:

The overall safeguards program is made up of a number of diverse and redundant systems which, when combined, are designed to provide a high degree of protection against the theft or diversion of plutonium and high enriched uranium. These activities fall into two broad categories: physical security and material control. Physical security--including physical barriers, intrusion alarms, and armed guards--provides the first line of safeguards protection. Material control--comprised of access controls, containment, and material accounting--reinforce the protection provided by physical security measures and provides a quantitative basis for material accountability. Material control measures are especially effective against internal diversion where the participants have authorized passage through barriers and access to material in the normal course of business.

The material accounting system can deter and detect, but not prevent the theft or diversion of material. The accounting system should be capable of continuously tracking the location and the movement of all discrete items and containers of SNM on inventory and of monitoring the in-process inventory for indicators of diversion. Through shipper-receiver comparisons, data monitoring programs, and periodic physical inventory checks, the accounting system provides positive assurance that SNM is indeed present. Should a significant loss of material occur, the system should be capable of identifying the general location and the quantity of material involved. The accounting system provides backup detection capability for theft and diversion which circumvent detection capabilities provided by physical security and other material control measures. Internal audits are directed to assuring that records have not been falsified.

Reliance cannot be placed solely on material accounting to detect theft and diversion because the effectiveness of the system is limited by timeliness and measurement uncertainties. Inventory discrepancies caused by measurement uncertainties will continue to occur in nuclear plants,especially, where chemical processing and scrap recovery are required. Accordingly, NRC is working on in-depth protection systems to prevent, deter, detect, and defeat any attempt to illicitly remove nuclear material from facilities.

15. Is the safeguards system at Erwin capable of providing protection against the threats being considered in the NRC safeguards studies?

RESPONSE:

The design threats being considered in the NRC safeguards studies are divided into an internal (diversion) and an external (assault) threat. Many parameters or considerations must be taken into account in describing or specifying such threats. To simplify these descriptions, it has been assumed that all of these parameters (e.g., motivation, training, arms, equipment, employment position, etc.) are fixed at worst-case values with respect to safeguards, and that the only remaining variable is the number of people involved in the threat. For a nominal or baseline threat, as a point of departure, the internal and external threats of two and six persons, respectively have been assumed. The range of numbers suggested by threat researchers, expert opinion, and partisan comments generally lie within a factor of two, up and down, from this baseline specification. Historical data indicate that the number of incidents involving groups of more than six persons account for only about 2.5 percent of the cases. By far the largest percentage (86%) involved groups of three persons or fewer.

The exact threat cannot be predicted with confidence, since it is an inherently uncertain problem and history is an unsure guide to the future. However, based on currently available evidence and expert opinion, an attack on nuclear facilities would likely stem from a relatively small number of persons, possibly aided by an insider. Present nuclear industry security measures are expected to deter most attacks and to prevent the success of such attacks as are attempted.

In-depth assessments have recently been completed of the safeguards program for the protection of special nuclear material at the NFS plant at Erwin, Tennessee. A number of weaknesses in the security and material control programs were observed and subsequently corrected. As a result of these actions,

it is believed that the safeguards program at the Erwin plant is capable of providing protection against the threat of attack by a small group, including a well-planned assault by three well-trained and equipped persons, one of whom may be an insider.

16. There have been reports of possible fraudulent manipulation of records at Erwin, Tennessee. Does the NRC have a special group for detecting such fraud? If so, what is the experience of the members of this group? What is the FBI's responsibility? At what point would the FBI be called in?

RESPONSE:

The NRC has the expertise to detect manipulation of records for fraudulent purposes. There is no special group but rather a team is formed to meet the specific nature of the problem or allegation. Within the Regional Offices and in Headquarters there are auditors, production specialists, chemists, and investigators who can be brought together for special investigations.

Under the Atomic Energy Act, the FBI is responsible for investigating criminal violations of the Act. They are notified by the NRC staff as soon as there are indications or evidence of illegal activity. It is their decision and that of the Justice Department as to whether or not the FBI investigates an incident.

17. We have received a report that workers at Erwin, Tennessee could have removed highly enriched uranium through an alarmed but unguarded side door and have left the premises before the guard at the gate could do anything about it. Is this report accurate? How long did this situation exist? What remedial steps were taken and on what date?

RESPONSE:

Safety demands that material access areas contain doors that can be used as emergency exits. Such doors are necessarily not locked on the inside but are alarmed to alert the central alarm station that a door has been opened. NFS has remained in compliance with this regulatory requirement.

While it would be possible to leave a material access area through an emergency exit with SNM, an individual would likely be stopped before leaving the facility boundary.

On January 26, 1976, NFS was informed that tamper-indicating seals were also to be applied to all emergency exits. A search outside the exit (defined by 100 foot radius sector) for SNM must be conducted if a seal is broken.

18. Mr. Chapman testified that calculations indicated that sabotage of spent fuel would not lead to an "...extreme hazard outside the immediate vicinity of where the event might occur." Please provide the calculations which lead to this conclusion.

RESPONSE:

Assuming a small bore penetration of a spent fuel cask, as might be produced by a well constructed shaped charge well coupled to the external surface of the cask, a conservative estimate of the source strength for escaping radioactive material has been made to obtain an upper bound estimate of the radiological doses that might be absorbed by the surrounding population. For a cask carrying fifty percent more fuel than is currently authorized, the estimated releases of radioactive gases and aerosols are 1.6×10^4 curies of Krypton-85, 0.3 curies of Iodine-131, and 1.9×10^3 curies of gross fission products. Assuming average weather conditions based on Pasquill stability categories A-F, the whole-body dose to an adult standing 50 meters away and downwind from the sabotaged cask is estimated to be about 20 rem. The threshold for noticeable physiological effects from whole-body radiation averages 50 rem. In an area equivalent to a 22.5 degree sector extending from 50 meters to 20 miles, the population dose is estimated to be 2, 20, and 200 person-rem for population densities of 100, 1000, and 10,000 persons/sq. mi., respectively. Accepting the conclusion of the BEIR report that the fatality rate is 1.80×10^{-4} cancer fatalities/person-rem, the number of fatalities in a population of density 10,000 persons/sq.mi. does not exceed one. From these estimates, it may be concluded that sabotage of a spent fuel cask does not represent an extreme radiological health hazard.

The calculations are presented in the appendix.

19. During the hearing a Subcommittee member expressed concern that fines levied for violation of safeguards regulations were insufficient to constitute a real deterrent. In response to this expression of concern Mr. Case said:

> "The real penalty (for violation of safeguards regulations) is the public notoriety and the public pressure. That is one of the

things that results from NRC imposing these fines, a lot of newspaper publicity, and that by far is a more expensive penalty on the company."

Does the NRC agree with Mr. Case that the prime deterrent against these violations is the prospect of adverse publicity? Enumerate fines levied as a consequence of safeguards violations since establishment of NRC. What is the rationale for setting fines at these levels?

RESPONSE:

We believe that licensees suffer from the attendant public notoriety as well as from the monetary penalty; perhaps in some cases the former has the greater impact. The implication should not be drawn from Mr. Case's remarks that the civil penalty is the ultimate sanction available to the NRC staff. The staff has a spectrum of sanctions which include Notices of Violation, Civil Penalties and Orders to show cause why a license should not be modified, suspended or revoked. The civil monetary penalties fit in the middle of this spectrum. One of the great impacts that a civil penalty should have on licensees is an indication that the NRC staff is escalating the enforcement action and that further acts of similiar noncompliance may result in an order to suspend or to revoke the license. We believe that this provides the greatest incentive for the licensee to achieve corrective action and to prevent future items of noncompliance.

Since January 19, 1975, the NRC has imposed six civil penalties in which all or part of the items of noncompliance were related to safeguards. The monetary value of the penalties for safeguards violations is $45,600. Additionally, NRC recently issued a notice of intent to impose civil penalties on a licensee amounting to $26,500 for failure to comply with safeguards requirements. The rationale for setting fines at these levels is:

(1) The limits for a civil penalty are established in the Act as $5,000 for any one violation per day not to exceed $25,000 for all violations during any 30-day period.

(2) A range of penalties has been established for different types of licensees based on the quantity, the form, and the strategic value of the radioactive materials authorized in the licenses; and the potential threat to the health and safety of the public.

(3) In determining the particular amount in any specific instance, all relevant factors are considered, including the nature and number of items of noncompliance, the licensee's past performance, the frequency of noncompliance, the length of time the noncompliance existed, whether the items of noncompliance are repetitive, the steps taken to correct the noncompliance, and the licensee's stated intentions or performance in correcting them promptly.

18. Mr. Chapman testified that calculations indicated that sabotage of spent fuel would not lead to an "...extreme hazard outside the immediate vicinity of where the event might occur." Please provide the calculations which lead to this conclusion.

RESPONSE:

Assuming a small bore penetration of the cask (shaped charge), a conservative estimate of the source strength for escaping radioactive material is made to obtain an upper bound estimate of the radiological doses tht might be absorbed by the surrounding population. Other conservative estimates, which will be identified later, also enter the dose calculations. These estimates are called conservative because they lead to results for radiological doses that are thought to be too large. Realistic estimates would lead to smaller dose results. The intention is to show that the upper bound doses are small, at least for a region of space not too close to the ruptured cask. The difference between the dose results corresponding to the conservative and realistic estimates, respectively, then represent safety factors.

The largest of the currently approved spent fuel casks can accommodate 7 fuel elements from a pressurized water reactor (PWR), or 18 fuel elements from a boiling water reactor (BWR). A PWR element contains about 450 kilograms of uranium, and a BWR element contains about 200 kilograms of uranium. The uranium in either element is limited to an enrichment in the uranium-235 isotope of 4 percent. Because of

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the heat load limitation (210,000 Btu/hr), a full fuel load is represented by 3.1 metric tons of uranium, corresponding to a 150 day cooling time. A cask capable of transporting about 50 percent more fuel than currently authorized is assumed in this analysis. The total radioactivity content is approximately given as follows:

Material	Physical Form	Radioactivity (Curies)
Krypton-85	Gas	5.2×10^4
Xenon-131m	Gas	1.5×10^1
Iodine-131	Gas	1.0×10^1
Gross Fission Products	Solid	2.1×10^7
Gross Actinides	Solid	6.3×10^5
Coolant Water (Fission Product Contamination)	Liquid	1.5

These data are based on published data in WASH-1238.[1]

The assumed sabotage scenario is a small bore penetration of the cask. All the coolant is released and all the fuel rods attain perforation temperature, releasing the entire gaseous and volatile inventory in the void space in the fuel. For Krypton-85, the activity in the void space is about 30 percent of the total activity in the fuel; for I-131, this quantity is about 2 percent; and for other fission products, it is about 0.01 percent. The quantities of actnides present in the void space are so small as to make their contribution to the dose negligible. The radioactivity released is given as follows:

Material	Physical Form	Estimated Release of Radioactivity in Sabotage (Curies)
Krypton-85	Gas	1.6×10^4
Iodine-131	Gas	0.3
Gross Fission Products	Aerosol	1.9×10^3

After radioactivity is released from the spent fuel cask in the form of a gas or aerosol, the dose absorbed by a person situated away from the cask is calculated from the formula:

$$D(x) = KQ_o \frac{\chi(x)}{Q}$$

where $\frac{\chi(x)}{Q}$ is the atmospheric concentration of radioactivity per curie released per unit time as a function of distance x in the direction of the wind away from the cask, $(Ci/m^3)/(Ci\ released/sec)$,

Q_o is the number of curies released,

K is a dose conversion coefficient, mapping atmospheric concentration of radioactivity into radiological dose rate $(rem/sec)/(Ci/m^3)$, and

$D(x)$ is the radiological dose absorbed at a distance x downwind from the cask, rem.

The values of Q_o are given above for Krypton-85, Iodine-131, and gross fission products.

The values of K are given in WASH-1238 for Krypton-85 and Iodine-131. The value of K for gross fission products is taken to be that of an absorber at ground level in an infinite cloud of 0.5 MeV gamma radiation.

Material	Dose	$K\left(\frac{rem/sec}{Ci/m^3}\right)$
Krypton-85	Skin - due to submersion in the cloud	0.053
Iodine-131	Adult thyroid - due to inhalation	320
Gross Fission Products	Whole Body - due to inhalation and immersion	0.12

The KQ_o products are the same for all subsequent calculations, so they are tabulated as follows:

Material	$KQ_o\left(\frac{\text{rem}\cdot\text{m}^3}{\text{sec}}\right)$
Krypton-85	850
Iodine-131	96
Gross Fission Products	230
Total	1176

Since all these contaminants are treated similarly as components of an infinite cloud, the dose to an individual adult becomes just the product of the χ/Q factor dependent on meteorological conditions and the sum of the KQ_o products for all materials.

The values of $\chi(x)/Q$ are graphed in WASH-1238 with the Pasquill weather stability classification as a parameter. The least stable weather conditions, and hence the least favorable for dose absorption, are denoted by Class A. The most stable of appreciably common weather conditions, and hence the most favorable for dose absorption, are denoted by Class F. An even more stable set of weather conditions, Class G, exists, but occurs rarely. Dismissing Class G and renormalizing the probabilities given in WASH-1238, one obtains an average χ/Q factor for a position 50 meters downwind from the ground level release as follows:

Pasquill Weather Stability Class	$\frac{\chi(50m)}{Q}$ $\left(\frac{Ci/m^3}{Ci/sec}\right)$	Probability of Occurrence	Weighted χ/Q_3 $\left(\frac{Ci/m^3}{Ci/sec}\right)$
A	2.0×10^{-3}	0.021	4.2×10^{-5}
B	2.5×10^{-3}	.088	2.2×10^{-4}
C	3.0×10^{-3}	.148	4.4×10^{-4}
D	6.0×10^{-3}	.479	2.9×10^{-3}
E	2.5×10^{-2}	.132	3.3×10^{-3}
F	8.0×10^{-2}	.132	1.1×10^{-2}
Average $\chi(50m)/Q$			1.75×10^{-2}

The dose to an adult at 50 meters downwind is given by:

$$D(50m) = \left(1176\ \frac{rem\cdot m^3}{sec}\right)\left(1.75\times10^{-2}\ \ \frac{sec}{m^3}\right)$$

$$= 20.6\ rem$$

The dose absorbed by a population situated away from the cask is estimated from Table 1, Appendix "B", of WASH-1238. This table is essentially a plot of dose per unit KQ_o factor, which is analogous to the χ/Q factor used above for an individual, vs area for the Pasquill weather stability classes. After a release incident, the radiation dose field may be represented by a contour map. The contour lines are characterized by the same concentration (D/KQ_o) of radioactivity at all points of the lines. The area within each contour is called an isopleth and is characterized by a dose that is larger than that found at the boundary. Assuming the population is distributed uniformly, the population dose is found from the proper combination of D/KQ_o values on isopleth boundaries and area values within the boundaries.

From Figure 1, the variation of D/KQ_o with isopleth area is approximated by a series of rectangles. For isopleth i, the ordinate width of the rectangle is given by 10^{-i} sec/m^3 (the units of D/KQ_o) and the abscissa

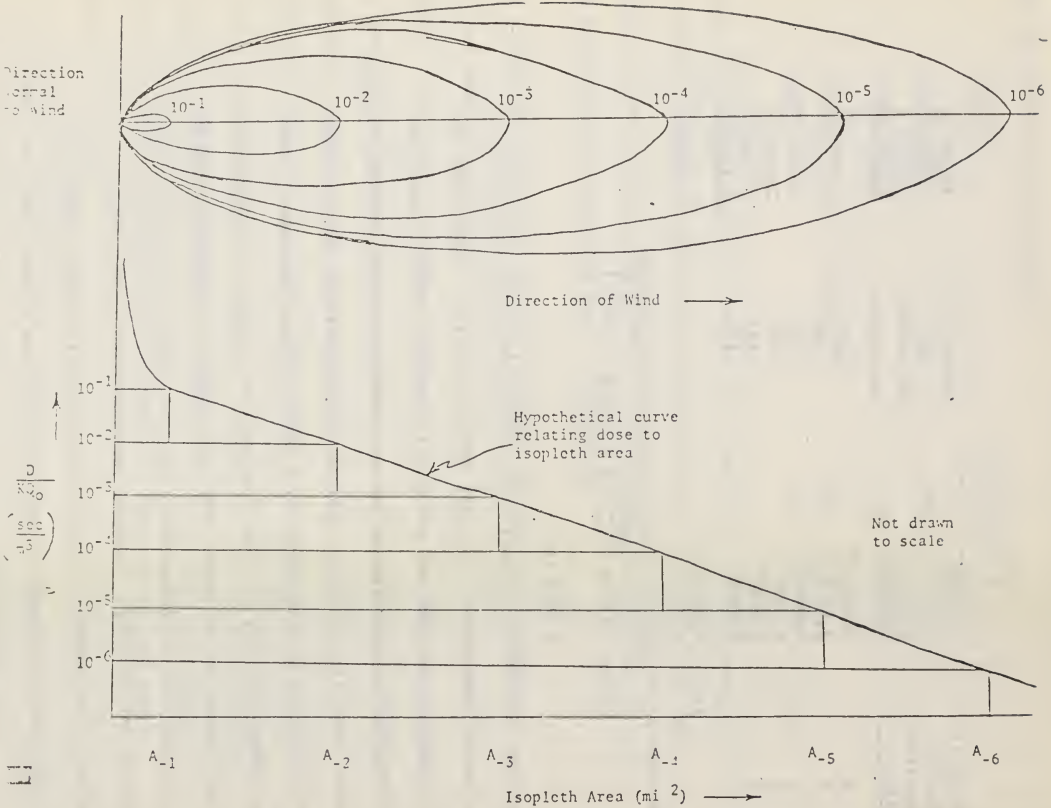

Figure 1. Representation of Radiological Dose Field After Release Incident

width is given by the area A_{-i} mi^2. The population dose is given approximately by

$$PD = P(KQ_o) \sum_{\substack{\text{all} \\ \text{nuclides}}} [A_{-6}\times10^{-6} + A_{-5}\times(10^{-5}-10^{-6}) + A_{-4}\times(10^{-4}-10^{-5}) + A_{-3}\times(10^{-3}-10^{-4}) + A_{-2}\times(10^{-2}-10^{-3}) + A_{-1}\times(10^{-1}-10^{-2})]$$

where P is the population density in people/mi^2. A sample evaluation of this formula for Class D weather, which is the most probable set of weather conditions, is given below.

Isopleth i	Area $A_{-i}(mi^2)$	$A_{-i}\times9\times10^{-(i+1)}$ $(mi^2 \frac{sec}{m^3})$
5	7.7×10^{-2}	6.9×10^{-7}
4	5.8×10^{-3}	5.2×10^{-7}
3	4.2×10^{-4}	3.8×10^{-7}
2	4.2×10^{-5}	3.9×10^{-7}
1	3.8×10^{-6}	3.4×10^{-7}
	Sum	23.2×10^{-7}
	$+A_{-6}+10^{-6}$	1.2×10^{-6}
		3.5×10^{-6}

$$(PD)_{\substack{\text{Class D} \\ \text{weather}}} = P(1176 \frac{rem\cdot m^3}{sec})(3.5\times10^{-6}\ mi^2 \frac{sec}{m^3})$$

$$= 4.1\times10^{-3}\ P\ rem\cdot mi^2$$

The corresponding results for all weather stability categories are given as follows:

Pasquill Weather Stability Class	Probability of Occurrence	PD/P $(rem\cdot mi^2)$
A	0.021	2.9×10^{-3}
B	.088	3.3×10^{-3}
C	.148	3.1×10^{-3}
D	.479	4.1×10^{-3}
E	.132	2.1×10^{-2}
F	.132	1.3×10^{-1}
	Average	2.3×10^{-2}

Population doses corresponding to several population densities which follow from these calculations for all weathers are given below.

Population Density (persons/mi^2)	Population Dose (person-rem)
100	2
1,000	20
10,000	200

The total area considered in this analysis is 77 square miles. Since the isopleth areas are roughly shaped as a sector of a circle, the total area corresponds roughly to a sector of angle 22.5 degrees extending from a small radius, say 50 meters, to a radius of about 20 miles. For weathers E and F, the individual at 50 meters is within the isopleth for which the concentration equals or exceeds 10^{-2}sec/m^3. For all other weathers, the individual at 50 meters is within the isopleth for which the concentration equals or exceeds 10^{-3} sec/m^3. As seen above, 10^{-2} sec/m^3 corresponds to about 12 rem and 10^{-3} sec/m^3 corresponds to about 1 rem.

The expected health effects from these doses are small. The NCRP recommended limits for routine exposure of radiation workers are 15 rem to the lungs and 30 rem to the thyroid. The threshold for noticeable physiological effects from whole-body radiation is 50 rem to the whole body. The conclusion of the BEIR Report [2] is that the fatality rate from such an incident is 1.8×10^{-4} cancer fatalities/person-rem. This rate is applicable to single large exposures as well as chronic exposures.[3] Thus, for a population density of

10,000 persons/mi^2, the number of fatalities is less than one for this postulated incident:

$$(1.8\mathrm{x}10^{-4} \text{ cancer fatalities/person-rem}) \ (200 \text{ person-rem}) = 0.036 \text{ cancer fatality}$$

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1 "Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants," U.S. Atomic Energy Commission, WASH-1238(1972).

2 BEIR Report, 1972, National Academy of Sciences - National Research Council, "The Effects on Populations of Exposure to Low Levels of Ionizing Radiation."

3 Cohen, B. L. "Conclusions of the BEIR and UNSCEAR Reports on Radiation Effects per Man-Rem," Health Physics 30, 351 (1976).

X. Worker Exposure to Ionizing Radiation

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

May 18, 1976

COPY

Mr. Marcus Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Rowden:

An article by Professor H.W. Ibser in the January, 1976, issue of The Progressive (copy enclosed) discusses the problems of radiation exposure to nuclear power plant maintenance personnel. The author suggests there will be an insufficient number of skilled technicians to incur radiation doses associated with various maintenance.

I would appreciate your indicating the extent to which the NRC considers this a serious problem and what steps are being taken to minimize it.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

encl.

(From The Progressive, January, 1976, p. 15)

The Nuclear Energy Game: Genetic Roulette

H.W. IBSER

Hibakusha, they are called in Japan; the bombed ones. They are the people who survived the nuclear bombings of Hiroshima and Nagasaki. Many have suffered from leukemia and other forms of cancer, typically occurring years after their exposure to the radiation from the bombs. The time lapse is different for different kinds of cancers.

The *hibakusha* have another sort of problem, too: Even those showing no sign of harm from the bombs are victims of the prejudice of their countrymen, who fear the genetic damage suffered by the *hibakusha*, and do not wish to marry them or their descendants. *Hibakusha* who have moved from the bombed cities keep their background secret—especially those with marriageable children, lest their children be avoided by possible marriage partners.

The *hibakusha* have been studied by the Atomic Bomb Casualty Commission (ABCC) since shortly after the American occupation of Japan at the end of World War II. Much has been learned from them about the effects of nuclear radiation—the invisible, penetrating rays produced by nuclear bombs and also by materials produced in nuclear power reactors.

The plight of the *hibakusha* contrasts with the American people's lack of concern for radiation exposure taking place in our nuclear industry. The public, with no bomb to attract its attention, seems generally unaware of radiation exposure conditions within the nuclear establishment. To some extent, perhaps, our attention has been diverted by debate over potential hazards posed by nuclear reactor accidents. Whether or not such debate is justified, current conditions in the nuclear industry are such that, if they were generally known and their genetic implications understood, nuclear workers might well become the victims of social prejudice like that against the *hibakusha*.

The occupational exposure situation in the United States is quite out of harmony with the nuclear establishment's picture of "safe, clean, nuclear energy." Before describing it, and in order to make its significance more clear, let us consider the background of the regulations governing exposure to nuclear radiation.

Nobel prize winning geneticist H.J. Muller's pioneering experiments in the 1920s showed that nuclear radiation (then available only from naturally occurring radioactive materials) does genetic damage, which becomes apparent in descendants of those exposed to the radiation. The International Commission on Radiological Protection (ICRP), in proposing the allowable limits to radiation exposure which have been adopted by the nuclear establishment, stated that the genetic

H.W. Ibser is a professor of physics at the University of C ''ornia, Sacramento.

ha l was "of greatest concern." Indeed, that hazard was taken as the determining factor in the ICRP considerations.

The ICRP standards stipulate that except for medical purposes, members of the general public should not be exposed, on the average, to more that 0.17 rem of ionizing radiation (X-rays or nuclear radiation) per capita per year. The rem is a unit of exposure; it is a measure of the biological damage caused by radiation.

Persons unfamiliar with the ICRP's reports, including workers in the nuclear industry and their families, commonly assume that ICRP recommendations, as adopted by Federal agencies, represent safe levels of exposure—in the sense that such exposures cause no significant damage. But this was not the point of view of the ICRP when it proposed the limits.

According to the *Recommendations* of the ICRP, Document 2, 1966: "This limitation necessarily involves a compromise between deleterious effects and social benefits. . . . The Commission is aware of the fact that a proper balance between risks and benefits cannot yet be made, since it requires a more quantitative appraisal of the probable biological damage and the probable benefits than is presently possible. . . . However, recommendations in quantitative terms are needed in the design of power plants and other radiation installations and particularly in making plans for disposal of radioactive waste products. . . . It is felt that

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Uninformed Opinion

Ebasco Services, a New York-based corporation which furnishes consultation, engineering, and construction services to the utility industry, recently c missioned Louis Harris and Associates to conduct "A Survey of Public and Leadership Attitudes Toward Nuclear Power Development in the United States." Results of the poll were published in August 1975.

The questions included in the poll made no reference to the genetic damage expected to occur as a result of radiation exposures permitted under present exposure limitation standards. When it proposed these standards, the International Commission on Radiological Protection considered them tolerable only because development of the nuclear industry required as much exposure as they allowed. ICRP documents make it clear that the ICRP considered the genetic *quid pro quo* to be of greatest concern in establishing the nuclear energy industry. Current practice, therefore, involves deliberate genetic damage to the population.

My inquiry as to the reason for lack of reference to this important matter by the poll elicited a candid response from Louis Harris and Associates Senior Vice President Carolyn E. Setlow:

"You have presumed in your letter that the Harris firm made a decision to omit reference to this matter in our nuclear energy survey. Unfortunately, this was not a decision but rather an oversight on our part. We built into our survey instrument, however, open-ende questioning which would allow for the expression concerns that we had not listed in our closed-ended questioning. I have reviewed the results and learned that there was no mention by the public of concern for exposure of the human gene pool to damaging radiation levels. This seems to be an area in which the public, like those of us involved in the survey design, have received little education. . . . You can be sure that any future research we do in the area of nuclear energy will make reference to the problem of genetic damage from radiation exposure."

I compliment Carolyn Setlow for her forthright letter. But I consider it remarkable that the genetic price of nuclear energy should have been so successfully hidden from the public that even a major, experienced surveyor of public opinion, acting, as I believe, in good faith, should have conducted a detailed poll (the summary alone of the survey results is twenty-nine pages long) of public opinion regarding nuclear energy without realizing that the original promulgators of the radiation exposure standards we are using considered genetic damage "of greatest concern" in evaluating the benefits of nuclear energy.

The nuclear industry has apparently managed to bring about the acceptance of regulation expected—by those who proposed them—to lead to serious damage of the human gene pool. The public has utterly failed to comprehend the facts about these regulations, partly because of their esoteric nature, but mostly because of failure of responsible authorities to publicize them. Under such circumstances only the unscrupulous and the ignorant can urge the expansion of the nuclear energy industry on the grounds of public acceptability. —*H. W.I.*

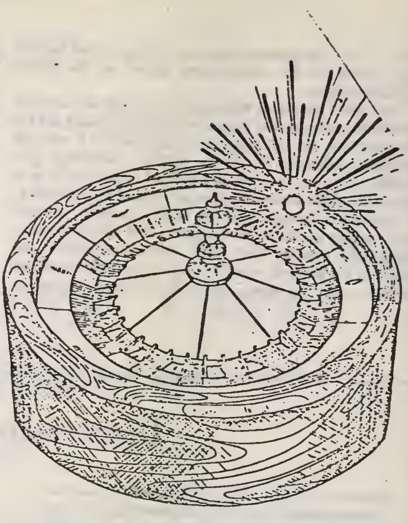
th' vel provides reasonable latitude for the expansion of atomic energy programs in the foreseeable future. It should be emphasized that the limit may not in fact represent the proper balance between possible harm and probable benefit. . . ."

Some scientists have urged—unsuccessfully, so far—that the exposure limits should be greatly reduced; notable in this regard is John W. Gofman, formerly engaged for years in research for the U.S. Atomic Energy Commission on the effects of radiation.

Workers occupationally exposed to radiation are allowed to receive thirty times as much radiation as the general population limit—up to five rems per year, as much as three rems in a single quarter (thirteen consecutive weeks). The ICRP's explanation: "Genetic effects manifest themselves in the descendants of exposed individuals. The injury, when it appears, may be of any degree of severity from inconspicuous to lethal. A slight injury will tend to occur in the descendants for many generations, whereas a severe injury will be eliminated rapidly through the early death of the individual carrying the defective gene [biological unit of genetic transmissal]. Thus the sum total of the effect caused by a defective gene until it is eliminated may be considered to be roughly the same [that is, the same as that of any other]. The main consideration in the control of genetic damage [apart from aspects of individual fortune] is the burden to society in future generations imposed by an increase in the proportion of individuals with deleterious mutations [genetic damage]. From this point of view, it is immaterial in the long run whether the defective genes are introduced into the general pool by a few individuals who have received large doses of radiation, or by many individuals in whom smaller doses have produced correspondingly few mutations. . . ."

Not all of the 0.17 rem per year accepted as the maximum tolerable average radiation dose for the general population is to be taken in person by the layman; some of it must be reserved for use by our proxies in the nuclear industry. The ICRP is quite explicit about this, even giving as an example a sample calculation illustrating this pooling of genetic damage. The mathematical precision of the calculation contrasts with the admission of a lack of any adequate knowledge of the biological damage to be expected from a given amount of exposure to nuclear radiation.

Thus, the relatively large radiation dose allowed nuclear industry workers is justified by the assumption that their genetic damage will be shared—diluted to "reasonable" levels by matings with the general population. But even this accommodation is not sufficient to enable the nuclear establishment to get its work done with its regular employes only. An article in the October 11, 1974, issue of *Science*, "Transient Nuclear Workers: A Special Case for Standards," reviews the common and longstanding practice in the nuclear industry" which is that industry's "solution" to its problem. Robert Gillette of *Science* points out that the Federal agency regulating the industry "has long con-



doned the use of virtually untrained supplemental or 'transient' workers in potentially hazardous radiation jobs, as long as they received some instruction in safety procedures and close supervision. . . ."

Reviewing, as an example, the conditions at Nuclear Fuel Services (NFS), a currently shut down nuclear reactor fuel reprocessing plant in West Valley, New York, the prestigious journal of the American Association for the Advancement of Science tells of "workers . . . as young as eighteen and others . . . alleged to have been recruited from bars for an afternoon's work. . . . Some reached legal exposure limits within minutes and were promptly paid off—half a day's pay (at about $3 an hour)—and replaced, in the derisive phrase of a former fulltime employe, by 'fresh bodies.' "

Science asks, "Should there be no limits on the extent to which nuclear facilities may spread the burden of occupational exposure?" but points out that "any sharp restrictions on temporary employment would no doubt cause considerable anguish in the nuclear industry, for indications are that transient workers comprise a large portion of the industry's labor force. . . ."

Typically, a rather rapid succession of workers may replace one another, as each reaches his dose limit for the quarter in turn. The NFS plant manager is reported to have used six men to remove one nut from a bolt.

According to a former NFS employe (who reached his exposure limit and the end of his job in three days), "I

do. recall a lecture about safety procedures as such. Mainly someone told us about the tools we would be using, that we had to remove some particles from the walls and they didn't want to burn out their technicians on the job." "We worked in a team, rotating one at a time. . . . You'd be all alone in there. The technician was outside, on the other side of an airlock and around a corner. . . . I don't know how much supervision is necessary, but I trusted them. I guess I was too dumb to be frightened."

A former NFS laboratory technician recalled, "The prevalent feeling was that these people were nuts for going in there and doing what they did." Said a former laboratory supervisor, "Some were really afraid, and they'd ask a lot of questions. I just tried to talk them into going home, but they wanted the money."

Bernard J. Verna, in the September 1975 issue of the journal of the American Nuclear Society, *Nuclear News*, expresses concern lest within a few years the nuclear industry "run into serious roadblocks due to a lack of available maintenance personnel." He describes a recent episode at Indian Point 1, a reactor owned by Consolidated Edison, New York City's electric utility company. About 1,500 men were used to locate, make welding repairs to, and cover with insulation six four-and one-half inch hot-water pipes, parts of the plant's steam generator system. Men worked in radiation fields of up to fifteen rems per hour. Even using the maximum lead shielding possible, the welding was done in a six-rems-per-hour radiation field, allowing only about fifteen minutes of actual work per man. Verna points out that supervisors find, not surprisingly, that under such conditions work is done with extremely low efficiency and many errors. Supervision is accomplished largely by means of closed-circuit television.

Almost every union welder in the New York-Westchester area was used on the Indian Point job, after which more were imported. The repair took six months, and cost almost $2 million.

Rancho Seco, the Sacramento Municipal Utility District reactor near Sacramento, California, had budgeted up to $100,000 for the current year for "radiation protection support personnel," to be supplied through a "unit price contract" by Nuclear Plant Services, a national corporation. When SMUD directors approved the contract, they asked their chief engineer whether the competence of all the temporary employes he thought he might need for plant maintenance could be assured, and whether the regular employes' union might not object to all the temporary hirings. The chief engineer merely assured them that those matters would not be problems. He did not explain that the primary justification for the work was a previously unirradiated body.

We have invested many billions of dollars in a nuclear industry whose maintenance depends on the availability of the services of increasingly large numbers of people whom the industry has not found it convenient, apparently, to inform fully of the peculiar nature of the hazard they incur. It is not clear that the industry would be able to continue if it were actually forced to give its employes a complete explanation of the risks.

The general public is unaware that it is playing genetic roulette by proxy. If it is to be fully and promptly informed of all the terms of the nuclear energy bargain, a substantial educational effort will be required—an effort quite out of harmony with the recently accelerated public relations campaigns of the Atomic Industrial Forum and the American Nuclear Society.

What would be the effect of calling to the attention of the public the fine print in the nuclear energy bargain that has been struck "on its behalf" by agencies composed largely of persons having professional interests in the development of nuclear energy? Knowing that part of the price of nuclear energy is genetic, would people continue willingly to cooperate in exposing themselves to radiation so as to spare regular plant employes—given the availability of other employment? Are we willing to buy nuclear energy with a "reasonable" number of defective children?

Would young, intelligent, well-informed people take temporary jobs exposing them to many times their safe level of radiation? If not, what sort of people would be doing the maintenance work around nuclear reactors, claimed by their proponents to be operated with the most meticulous care used in any industry? What sort of wages should be considered equitable for such work?

Would nuclear industry workers be avoided as marriage partners, as the *hobakusha* have been in Japan? Unlike much social discrimination, such stigmatization would have a rational basis.

The reaction of the public to a candid exposition of the genetic hazards posed by the nuclear industry can only be a matter of speculation at this time. Perhaps most people would share the attitude suggested by Dr. Frank K. Pittman when, as director of waste management and transportation for the Atomic Energy Commission and hence in charge of the disposal of radioactive materials produced by nuclear reactors, he appeared before the Subcommittee on State Energy Policy of the California Assembly in March 1973. Chairman Charles Warren asked whether Pittman would ". . . as a human being feel better about life on earth if we could develop other means of producing electricity than, say, nuclear?" Pittman responded, as recorded in the hearing transcript: "No, I don't think I'd feel any better, and I guess I have to look at this from a strictly personal viewpoint, and that is that for the time I have to remain on earth, it probably won't affect me personally, and so from that standpoint I don't think that nuclear energy—having it or not having it—is going to make any difference. . . ."

One wonders whether humanity has evolved as strong an instinct for the preservation of the species as is needed for its survival in a technological age. □

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 28 1976

OFFICE OF THE
CHAIRMAN

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy and
the Environment
Committee on Interior and Insular Affairs
United States House of Representatives
Washington, D. C. 20515

Dear Mr. Chairman:

This letter is in reply to your letter of May 18, 1976, requesting comments on the question of whether there will be an insufficient number of skilled technicians for nuclear power plant maintenance, considering the radiation exposure situations discussed by Professor H. W. Ibser in the January, 1976, issue of The Progressive.

The Nuclear Regulatory Commission (NRC) considers that the radiological health and safety of maintenance workers, as well as others who work in radiation areas, is an important matter requiring continuing attention. Our efforts to ensure that the radiation exposures to the public are maintained as low as reasonably achievable are paralleled by our efforts to ensure that occupational radiation exposures are likewise maintained as low as reasonably achievable. To reach this objective with respect to nuclear power plants, our present review of each license application considers the facility and equipment design as well as the operational actions that will be taken to minimize occupational radiation exposure. Attached is a copy of Regulatory Guide 8.8 Revision 1 which presently is used by the NRC staff in evaluating license applications for nuclear power plants with the objective of maintaining occupational radiation exposure as low as reasonably achievable (ALARA). Section C of this Guide describes in detail the specific areas evaluated to determine that the licensee has achieved the ALARA objective.

We have been pleased with industry's efforts to reduce occupational radiation exposure. These efforts are the results not only of our guidelines, but also the high cost of utilizing outside maintenance workers. Efforts taken by licensees include steps to reduce radiation

levels in maintenance areas, to use remote handling equipment, to improve maintenance procedures and to include specific design features in new plants. Today, repairs requiring a significant number of outside workers (such as those that were conducted at Indian Point Unit 1), although possible, are unlikely to occur.

The elimination of unnecessary occupational radiation exposure will continue to receive our active attention. We believe that the NRC regulatory program, coupled with the industry approach to this problem, will be successful in preventing a shortage of skilled technicians.

Sincerely,

Marcus A. Rowden

Marcus A. Rowden
Chairman

Attachment:
Regulatory Guide 8.8,
Revision 1

79-679 O - 76 - 13

U.S. NUCLEAR REGULATORY COMMISSION

Revision 1
September 1975

REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

REGULATORY GUIDE 8.8

INFORMATION RELEVANT TO MAINTAINING OCCUPATIONAL RADIATION EXPOSURE AS LOW AS IS REASONABLY ACHIEVABLE (NUCLEAR POWER REACTORS)

A. INTRODUCTION

Paragraph 20.1(c) of 10 CFR Part 20, "Standards for Protection Against Radiation," states, in part, that licensees should, in addition to complying with the limits set forth in that part, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as far below the limits specified in that part as practicable. This guide outlines the information relevant to maintaining occupational doses as low as is reasonably achievable (ALARA) needed by the NRC staff in license applications and safety analysis reports for nuclear power reactors.

B. DISCUSSION

The objective of efforts to ensure that occupational exposures are ALARA is to further reduce avoidable exposures and thereby reduce the low risks that are presumed to result from small doses. It has long been recognized by radiation control professionals that it is prudent to avoid unnecessary exposure and to hold doses as low as is reasonably achievable. This is determined by the state of technology and the economics of improvements in relation to the benefits from these improvements.

The available data suggest that past efforts have been relatively successful in that, generally, occupational exposures in NRC licensed activities have been well below the applicable limits of 10 CFR Part 20 (Refs. 1, 2). Thus, the recommendations of this guide are not intended to precipitate dramatic departures from past practice. Rather, they are intended to promote a more formal approach to keeping doses ALARA, to identify and promote continuance of good practices, and to promote further improvements where practicable.

The assumption of linearity between dose and response, recommended again by the Biological Effects of Ionizing Radiation (BEIR) Committee (Ref. 3), indicates concern about both population dose and individual doses. Thus it is not sufficient merely to control the maximum dose to individuals; the total dose to the group (measured in man-rem) must be kept as low as in reasonably achievable. It would be inappropriate to hold the individual doses to a fraction of the applicable limit if this resulted in the irradiation of more people and increased the total man-rem dose.

Effective control of radiation exposure involves the following major considerations:

1. Management commitment and support;

2. Careful design of facilities and equipment; and

3. Good radiation protection practices, including good planning and the proper use of appropriate equipment by qualified, well-trained personnel.

C. REGULATORY POSITION

Detailed information, as outlined in subsequent sections of this guide, should be provided in the license application about each of the above major considerations.

1. Management Philosophy and Organization

Maintaining occupational exposures at the lowest level reasonably achievable requires management commitment. A clear statement of operating philosophy regarding occupational radiation exposure should be included in the license application (or Safety Analysis

Report) and reflected in the licensee's facility design, policy documents, and written operating procedures and close and continuing management followup.

A specific individual (i.e., the Radiation Protection Manager) should be given explicit responsibility and authority for ensuring that exposures are ALARA. He should be directly responsible to someone at a high management level. The health physics group should not be a part of operations- or production-oriented divisions.

A member of upper management should be given responsibility for ensuring that the ALARA policy is implemented. He should conduct periodic reviews of procedures and practices for achieving exposures that are as low as is reasonably achievable.

2. Personnel Qualification and Training

•The Radiation Protection Manager (RPM) should be an experienced professional in applied radiation protection at nuclear facilities dealing with radiation protection problems and problems similar to those at nuclear power stations. The RPM should be familiar with the design features and operations of nuclear power stations that affect the potential for exposures of persons to radiation. The RPM should have the technical competence to establish radiation protection programs and the supervisory capability to direct the work of professionals, technicians, and journeymen required to implement the radiation protection programs.

The RPM should have a bachelor's degree or the equivalent in a science or engineering subject, including some formal training in radiation protection. The RPM should have at least five years of professional experience in applied radiation protection. (A master's degree may be considered equivalent to one year of professional experience, and a doctor's degree may be considered equivalent to two years of professional experience where course work related to radiation protection is involved.) At least three years of this professional experience should be in applied radiation protection work in a nuclear facility dealing with radiological problems similar to those encountered in nuclear power stations, preferably in an actual nuclear power station.

Any person whose duties entail entering restricted areas or directing the activities of others who enter restricted areas should be instructed in the fundamentals of health physics and should be made aware of, and given the authority to implement, the licensee's commitments for maintaining doses ALARA in his areas of responsibility. His training should be commensurate with his duties and responsibilities as well as with the degree of radiation hazard anticipated. Personnel policies should include screening to ensure that radiation workers are responsible and conscientious and are qualified to perform their duties safely.

Personnel whose duties do not entail entering restricted areas should be (1) made aware of the reasons for keeping out of restricted areas and (2) denied access to restricted areas.

Personnel responsible for the design or approval of facilities including restricted areas or equipment for use in restricted areas should (1) receive instructions in the fundamentals of health physics including the importance of maintaining doses ALARA and (2) have ready access to and use a competent professional health physicist.

3. Facility and Equipment Design

Radiation exposures may be minimized by proper design of facilities and equipment. This requires a definite commitment by the applicant to provide preliminary and periodic design reviews by competent health physicists (with the support of other specialists) before and during construction specifically to ensure that occupational exposures will be ALARA.

Since a major portion of the occupational radiation dose is received during maintenance, inservice inspection, refueling, and nonroutine operations (including activities complicated by leakage and spillage of radioactive materials), these activities warrant special attention during design. Also, decommissioning can involve serious radiation exposures and should be considered during design. Designs should be reviewed to ensure that provisions have been included to achieve ALARA exposures in these situations. Specifically, the license application (at the construction permit stage) should provide information demonstrating that:

a. Equipment that may require servicing will be designed and located to minimize service time;

b. Instruments requiring in situ calibration will be located in the lowest practicable radiation fields;

c. Equipment and components requiring servicing will be located in or designed to be movable to the lowest practicable radiation fields;

d. The best available valves, valve packing, and gaskets will be used to minimize leakage and spillage of radioactive materials;

e. Penetrations of shielding and containment walls by ducts and other openings will be designed to minimize exposure and that shield design specifications will limit void content;

f. Radiation sources and occupied areas will be separated if possible (in particular, pipes or ducts containing potentially highly radioactive fluids will not pass through occupied areas);

g. Precautions will be provided (1) to minimize the spread of contamination and (2) to facilitate decontamination in the event spillage occurs;

h. Interior surfaces as well as the layout of ducts and pipes will be designed to minimize buildup of contamination;

•Lines indicate substantive changes from previous issue.

i. Systems that may become contaminated will be designed to include provisions for flushing or remote chemical cleaning prior to servicing;

j. The ventilation system will be designed to ensure control of airborne contaminants, especially during maintenance operations when the normal air flow patterns may be disrupted (e.g., open access portals);

k. Wherever practicable, radiation and airborne contamination monitoring equipment with remote readout will be included in areas to which personnel normally have access (where special conditions warrant, portable instrumentation may be substituted);

l. The ventilation system will be designed for easy access and service to keep doses ALARA during alterations, maintenance, decontamination, and filter changes;

m. Where practicable, shielding will be provided between radiation sources and areas to which personnel may have normal or routine access, and shielding will be designed for maintaining doses ALARA;

n. Movable shielding and convenient means for its utilization will be available for use where permanent shielding is needed but impractical;

o. Adequate shielding will be provided for radioactive wastes;

p. Remote handling equipment will be provided wherever it is needed and practicable;

q. All design features for radiation control will be designed to accommodate maximum expected (technical specification limit) failures such as fuel element cladding and steam generator failures; and

r. Sampling sites will be located so that exposures will be ALARA during such routine operations as sampling offgas, primary coolant, and liquid waste.

4. Plans and Procedures

Considerable dose reduction may be achieved through a carefully conceived and properly implemented planning and procedures program. As stated previously, a major portion of the occupational radiation dose is received during the activities of maintenance, inspection, refueling, and nonroutine operations. It is therefore essential that programs related to these activities involve careful planning and preparation, well-trained and qualified personnel, and specific exposure-reduction techniques as circumstances allow. Procedures governing implementation of such programs should be developed and included as routine operating procedures. As such, the license applications should include (1) at the construction permit stage, a commitment to and guidelines for providing these procedures and (2) at the operating license stage, a description of the procedures to be utilized for maintaining exposures ALARA. The procedures proposed in the applications should project :posures for various groups; identify sources, source .trength, radiation levels, and contamination levels; and include plans to:

a. Minimize source strength and contamination levels by flushing tanks, lines, etc., prior to performing the operation;

b. Minimize radiation levels in the work area by use of permanent and/or movable shielding;

c. Minimize airborne contamination by proper use of the ventilation system, including purging the area before entering, temporary ducts into the work area, and other modifications as appropriate;

d. Further minimize inhalation of radioactive materials by the proper use of state-of-the-art respiratory protection;

e. Ensure that the task is completed with the least practicable time in the radiation field (the availability and use of all appropriate tools and equipment, as well as the conduct of "dry runs," are especially important);

f. Complete the task with the fewest people in the radiation field consistent with safe operation;

g. Cope as expeditiously as possible with fires, spills, equipment failure, and other accidents that may occur;

h. Use remote handling equipment and other special tools that can help reduce external dose;

i. Provide adequate supervision and monitoring to ensure that procedures are followed, that the planned and proper precautions are taken, and that all the radiation hazards are identified;

j. Provide personnel monitoring equipment such as direct-reading pocket dosimeters or pocket alarm meters that will permit early evaluation of individual doses and the association of personnel exposure with specific operations (see Regulatory Guide 8.4);

k. Provide contamination control procedures to achieve ALARA exposures;

l. Ensure that radiation and contamination monitoring instruments are tested and calibrated correctly and frequently enough to provide a high degree of confidence in the data they provide (see Regulatory Guide 8.6);

m. Conduct postoperational debriefings to improve plans, identify shortcomings, and determine whether ALARA was achieved;

n. Maintain records, including exposure data, contamination problems, airborne hazards, and internal exposure data as shown by bioassay analyses and whole body counters, that will be helpful in providing guidance for future similar operations (see Regulatory Guide 8.7);

o. Perform as much work as practicable outside radiation areas;

p. Minimize personnel radiation exposures by planning for access to and exit from work areas and by providing service lines and work area communications prior to beginning the work;

q. Consider the use of special tools or jigs that could reduce radiation exposure through simplification, reduction in time, or reduction of mistakes;

r. Post radiation levels in the work area so that the areas of highest and lowest radiation level are clearly identifiable;

s. Minimize discomfort of workers so that efficiency will be increased and less time will be spent in radiation areas; and

t. Estimate total man-rem to be expended on large jobs and set man-rem goals.

D. IMPLEMENTATION

The purpose of this section is to provide information to applicants and licensees regarding the NRC staff's plan for utilizing this regulatory guide.

With the exception of qualifications for the RPM stated in Section C.2, this guide will continue to be used by the NRC staff as in the past in the evaluation of submittals in connection with an operating license application. With regard to RPM qualifications, the qualifications stated herein will be used in the evaluation of submittals in connection with an operating license application docketed after June 1, 1976. Applicants may propose alternative methods or personnel qualifications for complying with the specific portions of the Commission's regulations.

Although the Introduction section of this guide indicates that the guide should be used in the preparation of license applications and safety analysis reports, it is the position of the NRC staff that, if the RPM at an existing nuclear power station is reassigned or the incumbent is replaced, the new manager should have qualifications equivalent to those stated in Section C.2.

REFERENCES

1. A.W. Klement, Jr., C.R. Miller, R.P. Minx, and B. Shleien, "Estimates of Ionizing Radiation Doses in the United States 1960-2000," Environmental Protection Agency Report ORP;CSD 72-1, August 1972.

2. "Fourth Annual Report of the Operation of the U.S. Atomic Energy Commission's Central Repository of Individual Radiation Exposure Information," USAEC Report, September 1972.

3. C.L. Comar, Chmn. NAS-NRC BEIR Committee, "The Effects on Populations of Exposure to Low Levels of Ionizing Radiation," National Academy of Sciences–National Research Council, Washington, D.C., 1972.

XI. Security Alert

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

June 1, 1976

COPY

Mr. Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Rowden:

Pursuant to today's meeting attended by Messrs. Gossick and Chapman concerning last week's security alert, we would appreciate your promptly providing:

(1) The test of the message notifying NRC regional offices of the alert imposed on May 27, 1976.

(2) The name and position of the person or persons responsible for the decision to effectuate the alert.

(3) A narrative indicating the circumstances of the events leading to the decision to effectuate the alert. Such narrative to contain the following information:

(a) the number and nature of possible threats to the security of any nuclear power generating station or other facility licensed by the NRC, reported to the staff of the NRC during the period preceding the imposition of the May alert, and upon which the NRC based the decision to impose the alert;

(b) the date upon which each of the threats enumerated above became known to the NRC staff;

(c) the source of the information, i.e. undercover agent, reliable informant, direct threat communicated by mail or phone, etc; and,

XI. Security Alert

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

June 1, 1976

COPY

Mr. Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

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(a) the number and nature of possible threats to the security of any nuclear power generating station or other facility licensed by the NRC, reported to the staff of the NRC during the period preceding the imposition of the May alert, and upon which the NRC based the decision to impose the alert;

(b) the date upon which each of the threats enumerated above became known to the NRC staff;

(c) the source of the information, i.e. undercover agent, reliable informant, direct threat communicated by mail or phone, etc; and,

Mr. Marcus A. Rowden June 1, 1976

(d) the means by which the information regarding the threats enumerated in response to item one was conveyed to the NRC and the methods by which the NRC evaluated the reliability of the information.

(4) During the past 12 months, a listing of the occasions the NRC or its staff was supplied with information indicating the possibility of a threat to the security of nuclear power generating stations or other NRC licensed facilities. Such listing should include:

(1) the date of the incidents;

(2) the nature of the threat to the security of a licensed facility;

(3) the source of the information, i.e. undercover agent, reliable informant, direct threat communicated by mail or phone, etc;

(4) the procedure by which the information was conveyed to the staff of the Nuclear Regulatory Commission; and,

(5) any action taken by the Nuclear Regulatory Commission in response to the receipt of this information and the reason the specific action was taken or justification for taking no action.

(5) The extent to which the Nuclear Regulatory Commission has undertaken any investigation to determine how information regarding the alert imposed on May 27, 1976 was conveyed to the press. If so, please summarize the findings of that investigation. Has the NRC determined that information regarding this alert was released by any electric utility by any method other than in direct response to an inquiry initiated by the press.

(6) The NRC organization for receiving information concerning possible security risks, for evaluating such information, for making recommendations regarding responses, and for issuing advisories or warnings to licensees. Is this chain of responsibility the same for reactors and fuel cycle facilities?

We would also appreciate your informing us of any immediate plans of the Commission to reduce the level of public confusion which has followed revelation of the alert. Considering the pending vote in California and other states on related questions, we consider such immediate clarifications to be required.

r. Marcus A. Rowden June 1, 1976

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

George Miller, Member of Congress

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

June 4, 1976

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and Insular Affairs
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

We are pleased to respond to the inquiries which you and Mr. Miller made of us in your letter of June 1, concerning the NRC's May 27th message to licensees. Attached is a background statement which I believe provides the information you had requested. That attachment has been provided to the Joint Committee on Atomic Energy and also placed in our Public Document Room.

I would note for your information that the matter of past threats against nuclear facilities was thoroughly reviewed by the Joint Committee on Atomic Energy in hearings earlier this year. Enclosed is a copy of the Committee print on those hearings. Pertinent sections dealing with past threats are found beginning on page 140, and also in the Appendix on pages 564-566.

You asked whether the NRC has undertaken an investigation to determine how information on the May 27th action reached the press. We have not undertaken such an investigation. The NRC staff did not initially inform the press but did respond to inquiries received later.

With respect to the suggestion that the NRC should make a clarifying public announcement at this time, we see no need for one in view of the straightforward manner in which the matter already has been reported in the media. We will, of course, continue to respond to any inquiries from the press and the public.

Sincerely,

Lee V. Gossick
Executive Director
for Operations

Enclosures
Background Statement
Committee Print

Background on NRC's Message of May 27, 1976, to Facility Licensees on Increased Security Awareness

The Text of the Message

"INCREASED SECURITY AWARENESS"

"As you recall, we discussed with you on May 14, 1976, the reasons for increased attention regarding identification of NRC personnel requesting access to your facility. We have obtained information, not fully verified, from the intelligence community that two groups may have plans to take over or occupy one or more nuclear power plants on Memorial Day Weekend or to take other actions in early June. Incidents have occurred at two other utility facilities during the past week that may have security implications. So far, the incidents have been scattered with no consequences.

"Because of these recent events, we request your cooperation in alerting your security forces and plant personnel for the period Friday, May 28 through Tuesday, June 8 to assure that:

"1. Existing security plans are operative and that personnel are vigilant and security equipment and barriers are completely functional.

"2. Response forces and other interfacing organizations are alerted.

"3. Any security related even or occurrence at your nuclear facility is reported to the responsible Regional Office immediately."

The Decision Process

The staffs of three major operational units are involved in assessment of security threats. These are the Office of Inspection and Enforcement, headed by Ernst Volgenau; the Office of Nuclear Materials Safety and Safeguards, headed by Kenneth R. Chapman; and the Office of Nuclear Reactor Regulation, headed by Benard C. Rusche. Upon the receipt of information, the NRC staff seek whatever additional data

is deemed necessary--such as checking to determine the credibility of the source, and maintaining liaison with other Federal agencies. In the case of the May 27 action, the three senior office directors named above personally reviewed the information in hand and unanimously recommended that licensees be notified. Dr. Volgenau put the decision into motion with the approval of the NRC's Executive Director for Operations, and the Chairman.

Events Leading to the Decision

During several weeks preceding May 27, the NRC had received information from various sources--including utilities and other Federal agencies--that intrusions might be attempted at several nuclear power plants. It is not unusual for individual threats to be received with respect to a particular plant. What was unusual in this period was the number of threats, and the fact that several plants widely separated geographically appeared to be potential targets.

Information received in May included threatened activities in Illinois (over the Memorial Day Weekend), Washington, and California (with the California activity to take place before the June 8 referendum vote on a nuclear proposition). Also during May, there were reports of persons, under suspicious circumstances, in the vicinity of two power plants in Connecticut (one nuclear, one fossil-fueled). In two separate instances in recent weeks, the credentials of the NRC inspectors have been stolen along with other personal belongings. In neither instance did it appear the credentials were specifically being sought, but their unauthorized possession created concern that they might be used to attempt entry to a nuclear facility.

Other Threats

Attached (Table I) in tabular form is a listing of threats to plants during the past 12 months.

Response to Threats

When the threat information concerns a specific licensee, NRC usually receives the information from the licensee. In such cases, the information is evaluated and the Office of Inspection and Enforcement ensures that the licensee has implemented his security response plan and that the FBI and

local law enforcement agencies have been notified. When the licensee is not the source of the information, the Office of Inspection and Enforcement immediately notifies the licensee and then takes the actions described above.

When the threat information concerns a group of licensees, the credibility is assessed within NRC and, if appropriate, the threat information is dispatched through the IE regional offices to selected licensees.

Since the NRC came into being in January 1975, two similar actions have been taken--one in late December 1975 as a result of a rash of threats that followed a bombing at New York's LaGuardia Airport, and one last month as a result of the loss of the NRC credentials mentioned above.

The Receipt of Security Related Information

Information of a security nature is received by the NRC through a variety of channels including the licensees themselves, other Federal agencies, state and local law enforcement authorities. The information may be received directly at NRC headquarters, or by one of the five regional offices (Philadelphia, Atlanta, Chicago, Dallas, San Francisco) which then pass the information to headquarters. Assessment of the information may involve communication with Federal or local law enforcement authorities or other Federal agencies as appropriate. Regulatory action to be taken is determined as indicated in above in the section titled "The Decision Process." The procedure is essentially the same for reactors and fuel cycle facilities.

Attachment

TABLE I

The following security threats to nuclear installations have already been made public through postings in the NRC Public Document Room:

DATE		
6/10/75	Threat to Georgia Power Company (Hatch)	Anonymous telephone call to site security
7/2/75	Former employee gained illegal entry at Kerr-McGee Nuclear Corp. (fuel plant)	Licensee security force
7/4/75	Bomb threat to General Electric Co., Vallecitos Nuclear Center	Anonymous telephone call to site
7/14/75	Bomb threat to Carolina Power & Light (Brunswick)	Anonymous telephone call to site
7/23/75	Suspected arson at NFS-West Valley	Licensee
8/21/75	Bomb threat to Consolidated Edison	Anonymous telephone call to company headquarters
8/22/75	Bomb threat to Northeast Nuclear Energy Co. (Millstone)	Anonymous telephone call to site
9/1/75	Bomb threat to Commonwealth Edison (Zion)	Anonymous telephone call to site
9/23/75	Bomb threat to Carolina Power & Light (Brunswick)	Anonymous telephone call to onsite contractor
9/25/75	Forced entry to MIT Research Reactor Building Fenced Area	Violator reported himself to Boston police
9/26/75	Bomb threat to Consolidated Edison (Indian Point)	Anonymous telephone call to site security
10/14/75	Bomb threat to Westinghouse Electric (fuel plant)	Anonymous telephone call to site security
10/19/75	Bomb threat to Boston Edison (Pilgrim)	Anonymous telephone call to site

11/3/75	Bomb threat to Portland General Electric (Trojan)	Anonymous telephone call to site
11/3/75	Two bomb threats to General Atomics (fuel plant)	Anonymous telephone calls to site
11/4/75	Six bomb threats to General Atomic (fuel plant)	Anonymous telephone calls to site
11/8/75	Two bomb threats to Boston Edison (Pilgrim)	Anonymous telephone calls to local police dept.
12/2/75	Sabotage threat to Consumers Power Co. (Palisades)	Local police notified company
12/8/75	Bomb threat to Arkansas Power And Light	Anonymous telephone call to onsite contractor
12/11/75	Bomb threat to Allied General Nuclear Services (reprocessing plant)	Anonymous telephone call to site
12/23/75	Two bomb threats to Long Island Lighting Co. (Shoreham)	Anonymous telephone call to site

These threats to nuclear installations have occurred thus far in 1976:

1/19/76	Bomb threat to Babcock & Wilcox (fuel plant)	Anonymous telephone call to site
2/3/76	Threat to Westinghouse Electric (fuel plant)	Anonymous telephone call to site
2/4/76	Bomb threat to Pennsylvania Power & Light (Susquehanna)	Telephone call to New York State Police
2/26/76	Intruder at Pacific Gas & Electric (Diablo Canyon)	Highway patrol intercepted intruder following alarm
3/4/76	Threat to Pacific Gas & Electric (Diablo Canyon)	Threat message written on road map
3/5/76	Bomb threat to CP&L (Brunswick)	Anonymous telephone call to site.

3/5/76	Bomb threat to Pa. Power and Light (Susquehanna)	Anonymous telephone call to site.
3/8/76	Bomb threat to Pa. Power and Light (Susquehanna)	Anonymous telephone call to onsite constructor
3/9/76	Threat to Florida Power & Light	Local newspaper
3/25/76	Bomb threat at Purdue University (research reactor building)	Anonymous call to campus police
3/25/76	Bomb threat to Pacific Gas & Electric (Diablo Canyon)	Anonymous call to site
4/6/76	Bomb threat at Northeast Nuclear Energy Co. (Millstone)	Anonymous call to site
4/22/76	Intrusion threat at Florida Power & Light (St. Lucie)	Local newspaper
4/23/76	Bomb threat at Florida Power & Light (Turkey Point)	Local radio station
5/6/76	Bomb threat at Pacific Gas and Electric (Diablo Canyon)	Anonymous call to local radio station
5/7/76	Bomb threat at VEPCO (North Anna)	Anonymous call to site
5/12/76	Intrusion threat to Commonwealth Edison (Zion)	Chicago Office of FBI
6/1/76	Bomb threat to Boston Edison (Pilgrim)	Anonymous call to site

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

June 9, 1976

COPY

Mr. Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Rowden:

As you know, the May 27 security alert to NRC facility licensees has raised several questions concerning NRC procedures for handling such situations. A meeting between NRC officials and one of us did not resolve the question of Commission participation in the matter.

In order to clarify the Subcommittee's understanding, we are asking you and other Commissioners to provide the Subcommittee information with regard to the May 27 message concerning increased security awareness. Please indicate the date on which you became informed of the alert, the method by which you were informed, the date on which the Commission first discussed the alert, and the decisions resulting from such discussion.

Thank you for your assistance.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and the Environment

George Miller, Member of Congress

Identical letters to other commissioners

79-679 O - 76 - 14

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE
COMMISSIONER

JUL 1 1976

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

In response to your letter of June 10 concerning the May 27 notification of increased security awareness to NRC facility licensees:

- My office was notified on Thursday, May 27, by means of a Preliminary Notification report from the Office of Inspection and Enforcement.

- The Commission first discussed the matter as a group on Tuesday, June 1. The Commission's discussion primarily centered on an update of events and on procedures for responding to various inquiries.

Sincerely,

Edward A. Mason

Edward A. Mason
Commissioner

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE COMMISSIONER

July 1, 1976

The Honorable Morris K. Udall, Chairman
Subcommittee on Energy and Environment
United States House of Representatives

Dear Mr. Chairman:

Your letter of June 10, 1976 posed a number of questions regarding internal notification procedures used concerning the May 27 notification of increased security awareness to NRC facility licensees.

I received written notice from the Office of Inspection and Enforcement on May 27. The notice, which arrived in my office at about 4:30 p.m., was a Preliminary Notification, an interoffice communication used to advise Commission offices of matters of significance.

The Commission met as a group on June 1 to receive an update on events since issuance of the notice and to review the procedures followed in disseminating it. The Commission met again on June 3 to review further the procedures to be followed by the staff in assessing threat information and initiating action in such circumstances and to consider refinement and further formal development of these procedures.

Sincerely,

Richard T. Kennedy
Richard T. Kennedy
Commissioner

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE
COMMISSIONER

July 2, 1976

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is in response to your letter of June 9 requesting information regarding the May 27 notification of increased security awareness to NRC licensees.

I received a telephone call from John Harris, Director of NRC's Office of Public Affairs, advising me of the notification on Saturday, May 29. A "preliminary notification of event," which had been delivered to my office late in the afternoon of May 27, was brought to my attention on June 1. The Commission first discussed the May 27 notification at a meeting held on June 1.

Should you have any further questions regarding this matter, I would be happy to answer them.

Sincerely,

Victor Gilinsky
Commissioner

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

July 2, 1976

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and Insular Affairs
U. S. House of Representatives
Washington, D. C. 20515

Dear Mr. Chairman:

I am pleased to respond to the questions concerning the May 27 notification to licensees for increased security awareness which you and Mr. Miller set forth in your letter of June 9. A background statement containing pertinent information was provided by letter of June 4 from the NRC's Executive Director for Operations in reply to your earlier letter of June 1.

On May 26, 1976 Dr. Ernst Volgenau, Director, Office of Inspection and Enforcement, advised me of the NRC staff intent to take the subject notification action. Such action is within the general authority of the Director of the Office of Inspection and Enforcement. (As reflected in the background statement accompanying the NRC letter to you of June 4, similar notifications to licensees had been made on two prior occasions within the last six months.) Based on the information conveyed to me and the unanimous recommendation of the Director of Inspection and Enforcement, the Director of the Office of Nuclear Reactor Regulation, the Director of the Office of Nuclear Material Safety and Safeguards, as well as the Executive Director for Operations, I concurred in the proposed action. The following day, May 27, a written "Preliminary Notification" of the action underway by the staff was delivered to my office as well as to the offices of the other Commissioners.

The Commission first discussed this subject as a body on Tuesday, June 1. With a view to deriving maximum benefit from the experience gained in this and other recent cases, the NRC staff, at my direction, reviewed with the Commission on June 3 its procedures for assessing threat information and determining appropriate action.

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We are acutely aware of the need for responsible action in these matters. Such action must be sufficiently prudent to meet our obligations as regulators, and yet must be implemented in a way which minimizes the potential for public misunderstanding. Necessarily, this involves elements of judgment in assessing specific circumstances, and determining appropriate actions. Our objective is to exercise that judgment as responsibly as possible.

I trust this will clarify the matters raised in your questions.

Sincerely,

Marcus A. Rowden

Marcus A. Rowden
Chairman

Identical Letter Sent to
The Honorable George Miller

NINETY-FOURTH CONGRESS

JAMES A. HALEY, FLA., CHAIRMAN

ROY A. TAYLOR, N.C.
HAROLD T. JOHNSON, CALIF.
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PHILLIP BURTON, CALIF.
ROBERT W. KASTENMEIER, WIS.
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LLOYD MEEDS, WASH.
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JOSEPH P. VIGORITO, PA.
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COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

CHARLES CONKLIN
STAFF DIRECTOR

LEE MC ELVAIN
GENERAL COUNSEL

MICHAEL C. MARDEN
MINORITY COUNSEL

July 7, 1976

Mr. Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Rowden:

We appreciate receiving Mr. Gossick's response to our letter of June 1, 1976, regarding the security alert imposed on May 27th of this year. Unfortunately, however, we believe that Mr. Gossick's letter, background statement and attachment did not fully respond to the matters raised by our letter. We would appreciate, therefore, your response to the following items:

I. In response to item No. 2 of our letter of June 1, you responded that Dr. Volgenau of the Office of Inspection and Enforcement "put the decisions [to notify licensees] into motion with the approval of the NRC's Executive Director for Operations, and the Chairman."

In what form was the Chairman's approval transmitted and what information was supplied to the Chairman prior to his granting of approval? If information regarding the facts upon which a recommendation for implementation of an alert was reduced to writing in the form of memorandum, issue paper or other document for the purpose of informing the Chairman or other member of the Commission, please supply us with a copy of such document or documents.

II. Item No. 3 of our June 1 letter requested "a narrative indicating the circumstances of the events leading to the decision to effectuate the alert." Your response listed the following incidents:

(a) "threatened activities in Illinois (over the Memorial Day Weekend)";

(b) threatened activities in Washington;

(c) threatened activities in California;

(d) "reports of persons", under suspicious circumstances, in the vicinity of two power plants in Connecticut (one nuclear, one fossil fueled) and

(e) table 1 accompanying your letter indicates that in addition to the above incidents, there was one anonymous bomb threat to the VEPCO North Anna plant in Virginia;

In addition, your response indicates that "in two separate instances in recent weeks, the credentials of the NRC inspectors have been stolen . . . ."

Please provide the following information:

(1) For each incident listed as (a) through (e) above --

(A) The name or other means of identification, of the person or persons who were the source of information regarding the threatened activities;

(B) The circumstances in which the information from the above person or persons conveyed the information to the staff of the Nuclear Regulatory Commission, including the name and occupation of any intermediary individuals and the name and position of NRC employees who received the information;

(C) The method by which the information was conveyed to the staff person or persons of the NRC (e.g. hand written, word of mouth, telegram, etc.). If any information identified in response to this item (C) was conveyed in any written form, please supply copies of such documents with the response to this inquiry;

(D) A statement setting forth the method by which NRC evaluated the validity of the information conveyed to it regarding each incident (a) through (e) listed above (if any evaluation or analysis of the validity of information regarding incidents was reduced to writing by the NRC or its staff, please furnish us with copies of such documents). This statement should include an inclusive listing of the factual elements known to the

NRC or its staff that would tend either to establish or discount the reliability or the credibility of the information regarding the incidents (e.g., the reliability of information supplied by informant in the past, participation by suspects in threats to nuclear power facilities in the past, etc.).

(E) The date upon which the incidents in (1) Illinois (2) Washington (3) California (4) Connecticut and (5) Virginia became known to the NRC staff;

(2) with respect to the report of persons under "suspicious circumstances in the vicinity of two power plants in Connecticut":

(A) the nature of suspicious circumstances;

(B) the name and location of the power plants;

(C) the date upon which the suspicious circumstances occurred and

(D) the identity and employment of the person or persons reported in such suspicious circumstances (if known to the staff of the NRC);

(E) the means by which knowledge of such persons in suspicious circumstances in the vicinity of power plants in Connecticut was conveyed to the NRC staff;

(F) the result of any follow-up investigation by the staff of the NRC, or any other agency or individuals known to the NRC or its staff, including conclusions as to whether, in fact, the "suspicious circumstances" did constitute a threat to the security of either power plant in question;

(G) whether there was to the knowledge of the NRC or its staff, in fact, a threat of any nature existed to the security of either the nuclear or fossil fuel power plant in Connecticut during or immediately after the observation of the "suspicious circumstances"?

III. During the meeting of Messrs. Gossick and Chapman with Congressman Miller on June 1, 1976, it was alleged by Messrs. Gossick and Chapman that one incident upon which the decision to implement the security alert was based involved a motor vehicle in the vicinity of a licensed facility, such vehicle being somehow connected to a person or persons in the "Weather Underground."

Please indicate: (a) the date, place and circumstances of this incident; (b) whether the NRC or its staff has determined that there was, in fact, any connection between the vehicle alluded to by Messrs. Gossick and Chapman and persons involved with the entity alluded to as the "Weather Underground," and (c) whether, in fact, persons associated with this vehicle did constitute a threat to the security of a facility licensed by the NRC.

IV. Item No. 4 of our letter of June 1, 1976 also sought to determine the nature of any action taken by the NRC in response to receipt of information regarding a possible threat to the security of a nuclear power generating facility or any other NRC licensed facility during the previous 12 months. Table 1 of your letter of June 4, 1976 included the date, nature of threat and source of threat. In addition, under the heading "Response to Threats," the background statement in the June 4 letter set forth, in general terms the procedures followed by the NRC in response to threats that are received. No information was supplied, however, in response to our request for the nature of the action taken by the NRC and the "reason the specific action was taken or justification for taking no action," in response to each alleged threat.

Again, therefore, we request that this information regarding actions taken, or reasons for taking no action, be furnished us for each of the 39 incidents listed on Table 1 accompanying your letter of June 4, 1976.

V. In your background statement accompanying your letter of June 4, 1976 you assert that with regard to the period prior to the implementation of the May 27 alert:

> "What was unusual in this period was the number of threats, and the fact that several plants widely separated geographically appeared to be potential targets."

From other information in your response it appears that there were two bomb threats in May (one in California, on May 6, the other in Virginia on May 7), one intrusion threat in Illinois on May 15 and persons under "suspicious circumstances" in the vicinity of two plants (one nuclear, one fossil fueled) on an unspecified date in Connecticut. It remains uncertain, however, whether there exists any clear criteria by which any potential threat is or can be evaluated with respect to the advisability of calling an alert in response to such potential threat. Please specify

the nature of the circumstances that distinguish these events, which resulted in an alert, from the following events of the preceding months (indicated below) when, apparently, alerts were not implemented:

July, 1975

7/2/75	Former employee gained illegal entry at Kerr-McGee Nuclear Corp. (fuel plant)
7/4/75	Bomb threat to General Electric Co., Vallecitos Nuclear Center
7/14/75	Bomb threat to Carolina Power & Light (Brunswick)
7/23/75	Suspected arson at NFS-West Valley

November, 1975

11/3/75	Bomb threat to Portland General Electric (Trojan)
11/3/75	Two bomb threats to General Atomics (fuel plant)
11/4/75	Six bomb threats to General Atomics (fuel plant)
11/8/75	Two bomb threats to Boston Edison (Pilgrim)

March, 1976

3/4/76	Threat to Pacific Gas & Electric (Diablo Canyon)
3/5/76	Bomb threat to CP&L (Brunswick)
3/5/76	Bomb threat to Pa. Power and Light (Susquehanna)

3/8/76	Bomb threat to Pa. Power and Light (Susquehanna)
3/9/76	Threat to Florida Power and Light
3/25/76	Bomb threat at Purdue University (research reactor building)
3/25/76	Bomb threat to Pacific Gas and Electric (Diablo Canyon)

VI. Item 6 of our June 1 letter asked for specific information with regard to:

> The NRC organization for receiving information concerning possible security risks, for evaluating such information, for making recommendations regarding responses, and for issuing advisories or warnings to licensees. Is this chain of responsibility the same for reactors and fuel cycle facilities?

From Mr. Gossick's response, the precise nature of this organization remains vague. For example, is there an office established for the purpose of receiving and evaluating such information? If so, to whom does the director of this office report and how many persons are assigned to it?

VII. Please indicate how responsibility for reactor security is distributed within the NRC? Please indicate on an NRC organization chart the location of various offices and branches having responsibility for analysis of the reactor security problem, and for development and enforcement of regulations bearing on reactor security.

VIII. With regard to the Commissioners' involvement in this matter, we would appreciate the following information:

(a) Staff documents (with classified information deleted) which were the basis for your concurrence in the staff recommendation to issue the alert.

(b) The basis for the decision that the alert not be addressed by the Commission prior to its being used.

Thank you for your cooperation in this important matter.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

George Miller
Member of Congress

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE CHAIRMAN

September 23, 1976

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and Insular Affairs
United States House of Representatives
Washington, D. C. 20515

Dear Mr. Chairman:

I am pleased to respond to the questions which you and Mr. Miller set forth in your letter of July 7, 1976, concerning the May 27, 1976 notification to licensees for increased security awareness. Enclosed are responses which supplement the June 4 letter from Mr. Gossick, Executive Director for Operations, and my letter of July 7, 1976.

This reply is necessarily lengthy. I would, however, like to emphasize certain points:

1. The increased security awareness message was issued as a precautionary measure due to the NRC staff assessment of an accumulation of threat information. The message did not call for additional security measures, only a heightened security awareness on the part of specified licensees.

2. The organizational process for issuing this awareness notice conforms to management practice within this agency. Although the Commission clearly retains final responsibility for all actions of the agency, authorities have been delegated to provide for an orderly functioning of the agency. The issuance of the awareness notice falls under a delegation of authority as does the issuance of permits, licenses and enforcement actions. The staff considered this action to be sufficiently unusual that my oral agreement was obtained prior to taking the action. However, the action could have been taken without my agreement having been previously obtained.

3. The handling of threats against nuclear facilities within the NRC is generally dependent on the specificity of the threat. Threats made against a specific plant are handled by the licensee and local support agencies according to

an NRC approved plan. Frequently, this licensee action has been completed prior to notification of NRC. The NRC role in such specific threats is to assure that the licensee has implemented appropriate provisions of his plan. For more generalized threats, such as those that led to the security awareness message, the NRC staff assesses the situation to determine action appropriate by the agency. In the case of the May 27 security awareness message, the staff's judgment was that the precautionary message was prudent and appropriate. I concurred in that judgment.

4. You raise questions concerning the credibility of information regarding threats and suggest that credibility might be established by the reliability of information supplied by the informant in the past, participation by suspects in threats to nuclear power facilities in the past, etc. The NRC does not possess, or plan to maintain, lists or cross-indexed files of informants or suspects. The NRC depends on other agencies to assess the reliability of the source of information. The NRC staff does qualitatively assess the capability of the threatener to convert the threat into an act and the near term consequences of the act. This NRC assessment is not performed by comparison against specific criteria. Rather, it is based on the collective judgment of experienced members of the NRC staff.

I trust that this letter with enclosure is responsive to your questions.

Sincerely,

Marcus A. Rowden

Marcus A. Rowden
Chairman

Enclosure:
Response to Questions

RESPONSE TO QUESTIONS

Response to Question No. I

As indicated in the July 2 letter to you, Dr. Volgenau discussed with the Chairman by telephone on May 26, 1976 the information available to NRC and the NRC staff assessment of that information. The information discussed by Dr. Volgenau was provided to you by Mr. Gossick, Executive Director for Operations, in his letter of June 4, and is amplified in the response to Question II below. The Chairman's agreement to the proposed action was given during that discussion. No documents were prepared for the Commission prior to issuing the increased security awareness message. As indicated in the responses to your June 9, 1976 letter, each Commissioner's office received notification, by a Preliminary Notification dated May 27, 1976, that the NRC Regional Offices had contacted all operating reactor and major fuel facility licensees concerning the increased security awareness.

Response to Question No. II

(1)(a) "Threatened activities in Illinois (over the Memorial Day Weekend)."

Information was received on May 12, 1976 from the FBI liaison agent of the FBI Chicago Field Office. This information was telephoned to J. Donahue, Chief, Security & Investigation Section, Safeguards Branch, Office of Inspection and Enforcement, Region III (Chicago), NRC. The NRC Region III Office transmitted the information by facsimile to K. Whitt, Regional Coordinator, Division of Field Operations, Office of Inspection and Enforcement, NRC, Washington, D. C. D. Thompson, Acting Director, Division of Field Operations, transmitted a similar message by facsimile on May 13, 1976, to each Commissioner, the Executive Director for Operations, and Directors of the Office of Nuclear Reactor Regulation and the Office of Nuclear Material Safety and Safeguards.

(1)(b) "Threatened activities in Washington; and
(1)(c) Threatened activities in California"

United Engineers and Constructors, an engineering firm on the east coast supplied the information about these two events to its office in the State of Washington. The firm's Washington Office (Mr. Linzy) then provided the information to Mr. Jackson, U. S. Energy Research and Development Administration (ERDA) Richland Office. That office then forwarded the information to Mr. Gallagher of the ERDA San Francisco Office. Mr. Gallagher then called R. Page, Deputy Director, Division of Safeguards, Office of Nuclear Material Safety and Safeguards (NMSS), NRC, on May 24, 1976. J. Yardumian, Manager, Special Projects, Contingency Planning Branch, NMSS, transmitted the information by telephone to N. Haller, Assistant Director for Safeguards, Office of Inspection and Enforcement on May 25, 1976, as well as to the FBI.

(1)(d) "Reports of persons, under suspicious circumstances in the vicinity of two power plants in Connecticut (one nuclear, one fossil-fueled)."

Information on these two events was provided to J. Devlin, Chief, Security and Investigation Section, Safeguards Branch, NRC Region I Office (Philadelphia) on May 18, 1976 by the Northeast Nuclear Energy Co. Corporate Security Office. Northeast Nuclear Energy Company is an NRC licensee. This information was telephoned to the NRC Office of Inspection and Enforcement which later disseminated the information by telephone to the Office of Nuclear Reactor Regulation, the Office of Nuclear Material Safety and Safeguards, and the Executive Director for Operations. No written document was used to disseminate this information within the NRC.

(1)(e) "Anonymous bomb threat to the VEPCO North Anna Plant in Virginia."

On May 4, 1976, the North Anna Plant Manager notified M. Kidd, Reactor Inspector, Region II (Atlanta), NRC, of the bomb threat. The information was transmitted by facsimile to G. Gower, Regional Coordinator, Office of Inspection and Enforcement (IE). D. Thompson, Acting Director, Division of Field Operations, IE, then transmitted similar information by facsimile to the Commissioners, the Executive Director for Operations, B. Rusche, Director of the Office of Nuclear Reactor Regulation and K. Chapman, Director of the Office of Nuclear Material Safety and Safeguards.

The information on events identified in (1)(a) through (1)(d) above was assessed and evaluated by senior NRC staff members including the Directors of the Office of Inspection and Enforcement, the Office of Nuclear Reactor Regulation, and the Office of Nuclear Material Safety and Safeguards. The NRC staff depends on other agencies to assess the validity or credibility of the informants. The collective judgment of senior staff members was used to arrive at the decision to issue the increased security awareness message. The information on the event identified in (1)(e) above was assessed and evaluated by the staff in the Office of Inspection and Enforcement, NRC Region II Office (Atlanta). E. McPeak, Physical Security Inspector, notified the FBI of the bomb threat.

(2) "Report of persons under suspicious circumstances in the vicinity of two power plants in Connecticut."

On May 15, 1976, a guard at the Montville Power Station (a non-nuclear power plant) on the Thames River observed a scuba diver in the water at the intake structure. When the diver saw the guard, he swam up the river where he was met by a second diver. Both divers, identity unknown, left the area. Of concern to the NRC was the fact that the Montville Station intake structure is similar to the nearby Millstone Point Nuclear Power Station at New London, Connecticut. The intake structure of a Nuclear

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Power Plant is an important structure for ensuring continued plant safety by the removal of heat during routine and accident conditions.

A Connecticut State Police scuba diver examined the intake structure, but found nothing unusual. The results of this follow-up investigation was reported to J. Devlin, Chief, Security and Investigation Section, Safeguards Branch, Region I (Philadelphia), NRC, on May 18, 1976, by the Northeast Nuclear Energy Co. Corporate Security Office.

Information on the second event is provided in the response to Question No. III.

Response to Question No. III

The event described in this question occurred on May 11, 1976 at the Millstone Point Nuclear Power Station, New London, Connecticut. The suspicious event occurred on the same day as the bombing of the Central Maine Power Company Office in Augusta, Maine. A letter received by the utility after the bombing from Fred Hampton's Unit of the People's Forces demanded that no additional nuclear plants be proposed.

The Millstone Station guard, in a security patrol car, observed an automobile with California license plates traveling toward the Millstone Station on the company-owned access road. It appeared to the guard that the occupants of the automobile saw the patrol car, made an abrupt "U" turn, and sped away. Their actions were considered suspicious by the guard.

The license plate number of the automobile was given by the licensee to the Connecticut State Police who checked the plate number through California. A California Official (individual and agency unknown to NRC staff) reported to the Connecticut State Police that the vehicle was owned by a person whose surname was identical to one associated with the Symbionese Liberation Army.

Further investigation of this incident by the Connecticut State Police disclosed that the car was owned by a California resident whose husband is on military duty stationed in Connecticut. The driver, having made a wrong turn, recognized his mistake and made a "U" turn to leave the property. The Connecticut Police apparently were satisfied with the driver's explanation; he did not represent a threat.

On May 18, 1976, the corporate security officer of the Northeast Nuclear Energy Company informed J. Devlin, Chief, Security and Investigation Section, Safeguards Branch, NRC Region I Office (Philadelphia) of the suspicious activity of the automobile on the Millstone Plant property and of the vehicle license check by the Connecticut Police. The licensee, Northeast Nuclear Energy Company, did not attribute high security significance to this event, but the matter was still open on that date. The event was closed by the licensee on June 3, 1976 and NRC was so informed.

Response to Question No. IV

Of the 39 events identified in our letter to you dated June 4, 1976, 30 of the events involved bomb threats at nuclear facilities. Upon receipt of a bomb threat, the licensee evaluated and assessed the credibility of the threat and implemented his security response plan. This security plan, approved by the NRC, prescribes actions to be taken. A copy of NRC Regulatory Guide No. 1.70, Subsection 13.6, which describes the information currently acceptable in a licensee's security plan is attached for your information. The role of the NRC staff is to monitor and assess the results of the licensee's actions. The physical search of the licensee's site is conducted by the plant security organization, often with the assistance of the local law enforcement authorities. In all 30 events involving a bomb threat, the licensee's response and search did not locate any explosive devices as threatened.

The remaining nine events in our letter of June 1 dealt with attempted or suspected acts of sabotage, unauthorized entry, and threats. A description of each incident and a summary of NRC/licensee actions are given below. The NRC inspection staff determined that the licensee's actions were responsive to the threats and were in accordance with their security plans. In some cases, local law enforcement authorities or other federal agencies have the lead in investigating the events.

Date Event

7/2/75 KERR-McGEE NUCLEAR CORP. Cimarron, Oklahoma

A former employee of Kerr-McGee was observed by a licensee guard climbing over the outer perimeter fence of the uranium facility. She was apprehended by the plant security force and taken into custody by the local law enforcement agency. The FBI and State Highway Patrol were notified of the event. The NRC staff reviewed the event during the next inspection.

7/23/75 NUCLEAR FUEL SERVICES, INC., West Valley, New York

A fire destroyed a barn used to store equipment. The barn although in a licensee controlled area was not in the physically secured area of the facility. The licensee and local law enforcement agency investigated the cause of the fire. Arson was suspected. The NRC staff reviewed the licensee's findings during the next inspection.

9/25/75 MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Boston, Massachusetts

An individual broke into areas around the reactor, but not into the reactor room. The reactor had previously been shutdown. Subsequently, the individual turned himself in to the Boston Police indicating that he had gained entry to demonstrate that it could be done. There was no damage to the reactor, and no loss or release of radioactive materials. The State of Massachusetts and the FBI were notified by the NRC of the event.

12/2/75 CONSUMERS POWER COMPANY, South Haven, Michigan

A resident of South Haven was overheard threatening sabotage of the Palisades Plant. The licensee and State Police investigation disclosed that the individual was unemployed and was a mental patient. The NRC notified the FBI of the event.

2/3/76 WESTINGHOUSE ELECTRIC CORP. Columbia, South Carolina

The licensee received a threat against the "nuclear business." It was not a direct threat to the Westinghouse plant. Recent participation on a local radio talk show by Westinghouse radiation specialists is believed by Westinghouse to have prompted the threat. The NRC notified the FBI of the event.

2/26/76 PACIFIC GAS & ELECTRIC CO., San Luis Obispo, California

An intruder activated an alarm in the information center at the Diablo Canyon reactor. This center is not within a secured area. A highway patrolman had seen the intruder and pursued the individual without results. There was no damage or material missing.

3/9/76 FLORIDA POWER & LIGHT CO., Miami, Florida

A message was found on the back door of the Miami Herald stating that hidden devices were placed at the licensee's Turkey Point nuclear power station and other Miami area sites. The threat was associated with high utility rates. The FBI and the local law enforcement authorities investigated; no devices were found.

4/22/76 FLORIDA POWER & LIGHT CO., Miami, Florida

The licensee's Commercial Manager in Stuart, Florida, was notified by a newspaper friend that a local conservation group would attempt to enter the St. Lucie Unit No. 1 power plant. The licensee implemented additional onsite security measures and notified the FBI and local law enforcement authorities. The attempt to enter the licensee's site did not occur.

5/12/76 COMMONWEALTH EDISON CO., Zion, Illinois

The FBI notified the NRC that information had been received indicating that an organized group planned to take over the Zion nuclear station on Memorial Day weekend. NRC notified Commonwealth Edison of the possible threat situation. The FBI investigated the matter and determined that no threat was involved. The "no threat" information was in an FBI communication on May 28, 1976.

Response to Question No. V

The differences between the events identified in your letter and the events leading to the increased security awareness message on May 27 are provided below.

Several of the threats which were the basis for the May 27 increased security awareness message were not site specific, nor were they as limited in time as most bomb threats. The threats were against unspecified nuclear targets and in a time frame of weeks rather than hours and days. For the period of time covered by the increased security awareness message, the non-specific threats, as well as specific threats, were directed at targets from coast to coast. In addition, one actual bombing had occurred earlier that month at the Central Maine Power Company Office. That bombing was accompanied by a general threat against future nuclear plants. Moreover, the NRC staff received the threat information in sufficient time to assess the information and to provide the security message. The message did not call for any increased security measures, only an alerting of personnel to the possibility of the need to utilize existing security measures.

For the fifteen events identified in Question V, the threats were directed at specific utilities or corporations, and the threats were limited in nature and time. For example, the former Kerr-McGee employee was apprehended as she climbed the fence. The threat was directed only against Kerr-McGee Nuclear Corporation, and it was terminated before NRC received notification of the event. In another event, the eight bomb threats against General Atomic in November 1975 were associated with employee unrest due to large layoffs at that specific site. Because of the nature of these threats against specific licensees and no information suggesting a more generalized effort against nuclear power plants, the NRC staff had no basis for issuing increased security awareness messages for these events. NRC reactor and fuel facility licensees have security plans designed to cope with plant-specific threats. A copy of the NRC review plan (NUREG-75/087) is attached.

Response to Question No. VI

Historically, intelligence information which was received from many sources outside of NRC had been provided to the Office of Inspection and Enforcement for assessment and action. Since May 27, all information is immediately provided to the Information Assessment Team (IAT) which is composed of one designated representative each from the Office of Inspection and Enforcement (IE), Office of Nuclear Reactor Regulation (NRR) and Office of Nuclear Material Safety and Safeguards (NMSS). The responsibilities of the IAT encompass all functions necessary to effectively compile and evaluate all available, pertinent intelligence data concerning licensed nuclear facilities and material; including, specifically, the development of working liaison with all agencies which might serve to provide such intelligence. The Directors of the above three Offices determine appro-

priate responses to threat information and implement same. Such actions primarily are the joint responsibilities of IE and NRR for reactors and of IE and NMSS for fuel facilities. The Directors of these Offices coordinate such activities with the Executive Director for Operations.

Response to Question No. VII

The responsibility for reactor security has been assigned to several offices. The Office of Nuclear Reactor Regulation (NRR) is responsible for reactor security policy and issuing reactor licenses and amendments which place plant specific security requirements on licensees. The Office of Standards Development (SD) is responsible for developing regulations and guides which are based on reactor security policy. The Office of Inspection and Enforcement (IE) including the five regional offices determines licensee compliance, initiates enforcement action when licensees are not in compliance, and makes recommendations to NRR, which are based on field observations, for improving reactor security. The Office of Nuclear Regulatory Research is responsible for confirmatory assessments of specific problems identified by NRR, IE, and SD. Attached are organizational charts for the offices, divisions and branches having responsibility for reactor security.

Response to Question No. VIII

As mentioned in the July 2 letter to you and in response to Question No. 1 above, there was no staff document on the increased security awareness message prepared for Commission concurrence. The issuance of the awareness notice falls under the general delegation of authority to Office Directors. Because the staff considered the increased security awareness message to be unusual, the Chairman's agreement was obtained prior to taking the action. However, the action could have been taken without the Chairman's agreement.

Attachments:
Regulatory Guide 1.70, Subsection 13.6
NRC Review Plan (NUREG-75/087)
Organizational Charts

13.6 Industrial Security

This section of the SAR should note that the applicant's plans for physical protection of the facility are described in a separate part of the application withheld from public disclosure pursuant to §2.790(d), 10 CFR Part 2, "Rules of Practice." Detailed security measures for the physical protection of nuclear power plants are required by §50.34(c), of 10 CFR Part 50, "Licensing of Production and Utilization Facilities," and applicable sections of 10 CFR Part 73, "Physical Protection of Plants and Materials." The regulatory position is set forth in Regulatory Guide 1.17, "Protection of Nuclear Power Plants Against Industrial Sabotage," and includes an endorsement of ANSI Standard N18.17-1973, "Industrial Security for Nuclear Power Plants."

13.6.1 Preliminary Planning (PSAR)

At the time of submittal of the PSAR, the applicant's separate submittal should describe plans for the screening of personnel who are to be employed to work at the proposed plant, including personnel selection policies, employee performance and evaluation procedures, and the industrial security training program to be used to ensure that reliable and emotionally stable personnel are selected, maintained, and assigned to the plant staff and to the plant security force.

It should also describe plans for incorporating physical protection objectives and criteria into the design of the plant and the layout of

equipment, including the following specific information as to how such plans will be or have been implemented:

1. Provide figures and/or drawings which identify the following:

a. Owner-controlled area, including private property markers, parking lot(s), and roads to be used for surveillance.

b. Protected area(s), including the associated isolation zone (clear area), physical barriers, access control points, lighting, intrusion monitoring and/or perimeter alarm systems, and roads or pathways to be used for surveillance.

c. Vital equipment and vital areas, including all access points.

d. Alarm station locations.

2. Describe the physical barrier construction for the protected and vital areas, and indicate the extent to which the positions set forth in ANSI N18.17-1973, Sections 3.3 and 3.4, are satisfied.

3. Describe the design features to be used for protecting all potential access points into the vital areas against unauthorized intrusion. Such features should include locking devices and intrusion detection devices.

4. Describe all intrusion alarms, emergency exit alarms, alarm systems, and line supervisory systems, and indicate the extent to which the level of performance and reliability specified by the Interim Federal Specification W-A-00450B (GSA-FSS), dated February 16, 1973, is met.

5. Describe the physical security provisions to be utilized in the design for the protection of security system service panels and wiring for protective devices, security communications systems, and door lock actuators.

6. Designate the person or group with the responsibility to conceive and detail security provisions in the physical plant design. If this responsibility is outside the owner organization, also specify the position within your organization responsible for the systematic review and control of the contracted activities.

13.6.2 Security Plan (FSAR)

At the time of submittal of the FSAR, the applicant's separate submittal should be a comprehensive description of the physical security program for the plant site. The information should include a description of the organization for security, a listing by title of all procedures to be established for plant security, access controls to the plant (including physical barriers and means of detecting unauthorized intrusions), provisions for monitoring the status of vital equipment, selection and training of

personnel for security purposes, communication systems for security, provisions for maintenance and testing of security systems, and arrangements with law enforcement authorities for assistance in responding to security threats. The implementation schedule for the physical security program should be provided, including phases for multi-unit plants, where applicable.

Specific information for which guidance may be found in applicable referenced sections of ANSI N18.17-1973 and which should be included in the separate description is as follows:

1. Clear diagrams, to approximate scale, displaying the following:

a. Designated security areas of the plant site, including physical barriers,

b. The locations of alarm stations,

c. The locations of access control points to protected areas and vital areas,

d. The location of parking lots relative to the clear areas adjacent to the physical barriers surrounding protected areas,

e. Special features of the terrain that may present special vulnerability problems,

f. The location of relevant law enforcement agencies and their geographical jurisdictions.

2. If the policy of the owner organization permits use of any part of the owner-controlled area by members of the general public, describe in detail the extent to which the position of Section 3.2 of ANSI N18.17-1973 will be met.

3. The response capabilities of local law enforcement agencies should be fully described (Section 4.4 of ANSI N18.17-1973), including estimates of the number of officers that can arrive at the plant site, in the event of a security threat, within five to fifteen minutes, fifteen to thirty minutes, and thirty minutes to one hour after receipt of a call for assistance.

4. A description should be included of any provisions for alternative interim protective measures during periods when one or more components of the total security system are not functioning.

U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

Section 13.6 INDUSTRIAL SECURITY

REVIEW RESPONSIBILITIES

Primary - Industrial Security and Emergency Planning Branch (ISEPB)

Secondary - None

I. AREAS OF REVIEW

At the preliminary safety analysis report (PSAR) stage, the review of this section covers plans for implementing security measures relating to (1) the screening of personnel employed to work at the proposed plant and (2) the layout of the plant and other design features and equipment arrangements intended to provide protection of vital equipment against acts of industrial sabotage.

At the final safety analysis report (FSAR) stage, the review involves the evaluation of the industrial security plan, which describes a comprehensive physical security program for the plant site. The review encompasses the physical security organization, access controls to the plant including physical barriers and means of detecting unauthorized intrusions, provisions for monitoring the status of vital equipment, selection and training of personnel for security purposes, communications systems for security, and arrangements with law enforcement authorities for assistance in responding to security threats. The implementation schedule for the physical security program is reviewed, including phases for multi-unit plants where applicable.

Specific information to be reviewed, referenced to applicable sections of ANSI N18.17-1973, include the following:

1. Clear diagrams, to approximate scale, displaying the following:
   a. Designated security areas of the plant site, including physical barriers.
   b. The locations of alarm stations.
   c. The locations of access control points to protected and to vital areas.
   d. The location of parking lots relative to the clear areas adjacent to the physical barriers surrounding protected areas.
   e. Special features of the terrain which may present special vulnerability problems.

f. The location of relevant law enforcement agencies and their geographical jurisdictions.

2. If the policy of the owner organization permits use of any part of the owner-controlled area by members of the general public, details of how the requirements of Section 3.2 will be met.

3. The response capabilities of local law enforcement agencies (Section 4.4.7), including estimates of the number of officers that can arrive at the plant site in the event of a security threat, within five to fifteen minutes, fifteen to thirty minutes, and thirty minutes to one hour, after receipt of a call for assistance. (This response capability bears upon the adequacy of the size of the onsite guard force.)

II. ACCEPTANCE CRITERIA

At the PSAR stage, preliminary planning for industrial security should show how conformance to the applicable provisions of Regulatory Guide 1.17 are expected to be achieved, including:

1. ANSI N18.17-1973, Section 2, "Definitions;" Section 3, "Designated Security Areas;" Section 4.3, "Employee Screening"; and Section 5, "Plant Design."

2. Regulatory Guide 1.17, Revision 1, Section C.1.b, "Security Alarms," and Section C.3, "Protection of Vital Equipment."

This planning should include a commitment to design phase review for physical security and should show how this responsibility is to be implemented by the applicant.

At the FSAR stage, the applicant's security plan must conform to the requirements of 10 CFR 50.34(c), and to applicable requirements of 10 CFR Part 73. In addition, the provisions of Regulatory Guide 1.17, Revision 1, including the requirements and recommendations of ANSI N18.17-1973, Sections 3 and 4, establish the basis for an adequate security plan for the protection of nuclear power plants against industrial sabotage.

Specific acceptance criteria, including staff interpretations of some of the more general requirements of the ANSI Standard, are as follows: (Section references are to sections of ANSI N18.17-1973.)

1. Surveillance of a protected area (Section 3.3.3) should be by a system which can provide for continuous monitoring of the entire perimeter of a protected area so as to allow response to be initiated at the time of penetration of a protected area.

2. Central alarm stations should be regarded as vital areas and meet the qualifications required thereof.

3. For each plant, the onsite security force should include not less than two guards on each shift.

4. "Armed guards" means guards physically carrying firearms. Persons assigned to control access points to protected areas should not be armed if their work post is exterior to the protected area.

5. If search procedures of individuals and packages they may be carrying are not stipulated for all persons and hand-carried packages entering the protected area, then selection of individuals and hand-carried packages for search should be on the basis of a random process which is exercised each time an individual is about to enter the protected area.

6. Essential vehicles (Section 3.3.1) allowed access to protected areas include those designated strictly for security or emergency purposes, or vehicles not used primarily for conveyance of people that must be allowed within the protected area to serve a required function.

7. Picture badge identification should be used to satisfy Sections 3.3.2.1 and 3.3.2.2, with special color coding or symbols to satisfy 3.4.1, when inside vital areas.

8. Casual visitor groups, such as tour groups do not constitute "persons having a need to enter such (vital) areas", Section 3.4.1.

Implementation of the physical security program should be accomplished one to two months before fuel loading. Security features required for new fuel in storage prior to loading of the first unit should be implemented as of the time fuel is onsite.

III. REVIEW PROCEDURES

At the PSAR stage, the review consists of a careful examination of the information submitted and comparison with the acceptance criteria set forth in II above. The general plant description in Chapter 1 and site-related information in Chapter 2 of the PSAR should be examined to determine if there are unique features that should be considered in establishing the physical protection program. It may be desirable at this stage to discuss the formulation of this program with the applicant.

At the FSAR stage, the physical security plan is reviewed to determine its conformance with the regulations, the information requirements of I above, and the acceptance criteria of II above. Applicable regulations, the position statements in Regulatory Guide 1.17, and the requirements and recommendations of ANSI N18.17-1973 are used as check lists for this review. The reviewer may also use appropriate Division 5 Regulatory Guides to the extent they are applicable to physical protection programs at nuclear power plants. Those having potential applicability are listed in the references. It is particularly important that the reviewer assure himself that all

items of vital equipment are contained within vital areas. A site visit by the reviewer may be necessary, during the construction phase, before the evaluation of the plan can be completed.

IV. EVALUATION FINDINGS

The evaluation finding at the PSAR stage should be substantially equivalent to the following statement:

"The applicant has provided a general description of plans for protecting the plant against potential acts of industrial sabotage. Provisions for the screening of employees at the plant, and for design phase review of plant layout and protection of vital equipment have been described and conform to Regulatory Guide 1.17. We conclude that the applicant's arrangements for protection of the plant against acts of industrial sabotage are satisfactory for this stage of the licensing process."

The evaluation finding at the FSAR stage should be substantially equivalent to the following statement:

"The applicant has submitted a comprehensive physical security plan for the protection of the plant against potential acts of industrial sabotage. This plan has been withheld from public disclosure pursuant to 10 CFR 2.790(d).

"This plan has been reviewed and found to contain features considered essential for such a program by the staff. In particular, it has been found to comply with the Commission's regulations including 10 CFR 50.34(c) and applicable sections of 10 CFR Part 73, and conforms to the positions set forth in Regulatory Guide 1.17."

V. REFERENCES

1. Regulatory Guide 1.17, Revision 1, "Protection of Nuclear Power Plants Against Industrial Sabotage."

2. ANSI N18.17-1973, "Industrial Security for Nuclear Power Plants," American National Standards Institute (1973).

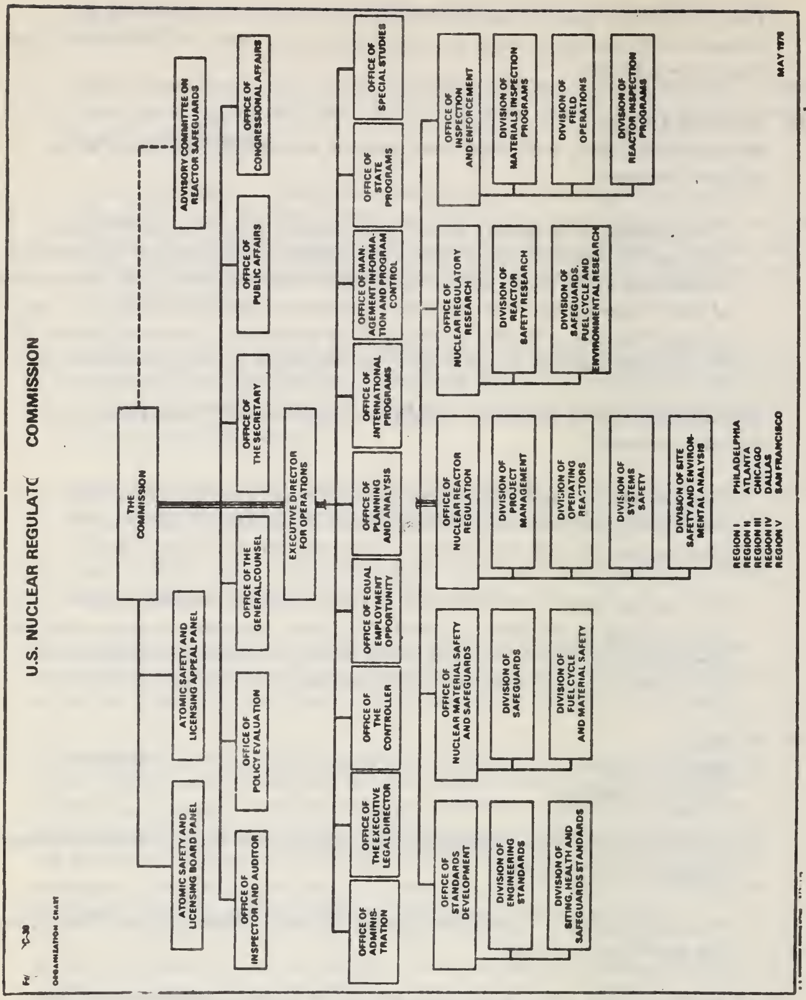
3. Regulatory Guide 5.7, "Control of Personnel Access to Protected Areas, Vital Areas, and Material Access Areas."

4. Regulatory Guide 5.12, "General Use of Locks in the Protection and Control of Facilities and Special Nuclear Materials."

5. Regulatory Guide 5.20, "Training, Equipping, and Qualifying of Guards and Watchmen."

6. 10 CFR 50.34(c), "Physical Security Plan."

7. 10 CFR Part 73, "Physical Protection of Plants and Materials."



U.S. NUCLEAR REGULAT COMMISSION
ORGANIZATION CHART
THE COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
ATOMIC SAFETY AND LICENSING APPEAL PANEL
ATOMIC SAFETY AND LICENSING BOARD PANEL
OFFICE OF INSPECTOR AND AUDITOR
OFFICE OF POLICY EVALUATION
OFFICE OF THE GENERAL COUNSEL
OFFICE OF THE SECRETARY
OFFICE OF PUBLIC AFFAIRS
OFFICE OF CONGRESSIONAL AFFAIRS
EXECUTIVE DIRECTOR FOR OPERATIONS
OFFICE OF ADMINISTRATION
OFFICE OF THE EXECUTIVE LEGAL DIRECTOR
OFFICE OF THE CONTROLLER
OFFICE OF EQUAL EMPLOYMENT OPPORTUNITY
OFFICE OF PLANNING AND ANALYSIS
OFFICE OF INTERNATIONAL PROGRAMS
OFFICE OF MANAGEMENT INFORMATION AND PROGRAM CONTROL
OFFICE OF STATE PROGRAMS
OFFICE OF SPECIAL STUDIES
OFFICE OF STANDARDS DEVELOPMENT
DIVISION OF ENGINEERING STANDARDS
DIVISION OF SITING, HEALTH AND SAFEGUARDS STANDARDS
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
DIVISION OF SAFEGUARDS
DIVISION OF FUEL CYCLE AND MATERIAL SAFETY
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF PROJECT MANAGEMENT
DIVISION OF OPERATING REACTORS
DIVISION OF SYSTEMS SAFETY
DIVISION OF SITE SAFETY AND ENVIRONMENTAL ANALYSIS
OFFICE OF NUCLEAR REGULATORY RESEARCH
DIVISION OF REACTOR SAFETY RESEARCH
DIVISION OF SAFEGUARDS, FUEL CYCLE AND ENVIRONMENTAL RESEARCH
OFFICE OF INSPECTION AND ENFORCEMENT
DIVISION OF MATERIALS INSPECTION PROGRAMS
DIVISION OF FIELD OPERATIONS
DIVISION OF REACTOR INSPECTION PROGRAMS
REGION I PHILADELPHIA
REGION II ATLANTA
REGION III CHICAGO
REGION IV DALLAS
REGION V SAN FRANCISCO
MAY 1976

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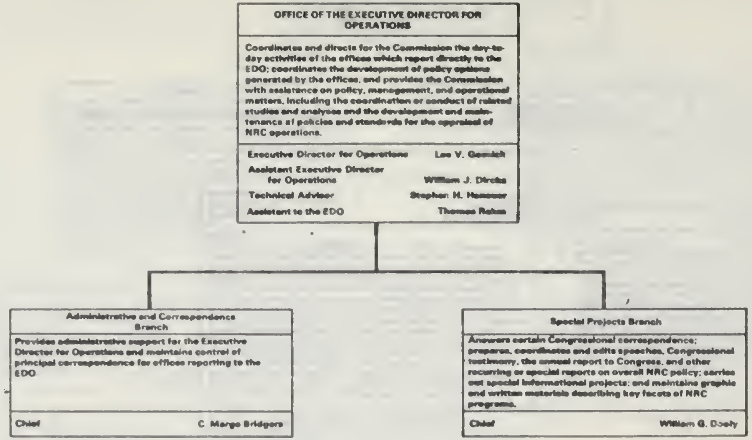
ORGANIZATION CHART

U.S. NUCLEAR REGUL)RY COMMISSION



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U. S. NUCLEAR REGULATORY COMMISSION

OFFICE OF STANDARDS DEVELOPMENT

Develops and recommends nuclear safety standards, criteria and guides for location, design, construction, operation and performance of reactors and other production and utilization facilities subject to licensing; and rules, regulations, standards and amendments thereto for (a) the protection of the public from the possession, use, transfer, and disposal of source, special nuclear, and byproduct materials and from the operation of nuclear facilities subject to licensing, (b) safeguarding nuclear materials held by licensees for the security of nuclear facilities, and (c) the protection of the environment. Develops and recommends rules, regulations, and standards for the preparation of environmental impact statements and environmental appraisals. Coordinates Commission participation in IAEA standards-related activities, and serves as principal point of contact for Commission with the American National Standards Institute and other organizations on matters concerning nuclear standards.

Director	Robert B. Minogue
Deputy Director	Ray G. Smith
Assistant to the Director	Carl E. Johnson

Program Support Branch

Provides administrative support in coordinating budgeting, contracting, recruiting, personnel actions, and mail control activities in SD. Provides technical program planning support in coordinating NRC participation in ANSI and IAEA standards development activities, SD program plans, SD research needs, and SD scheduling system. Provides technical editing of guides and other documents for publication, and maintenance of distribution lists for guides.

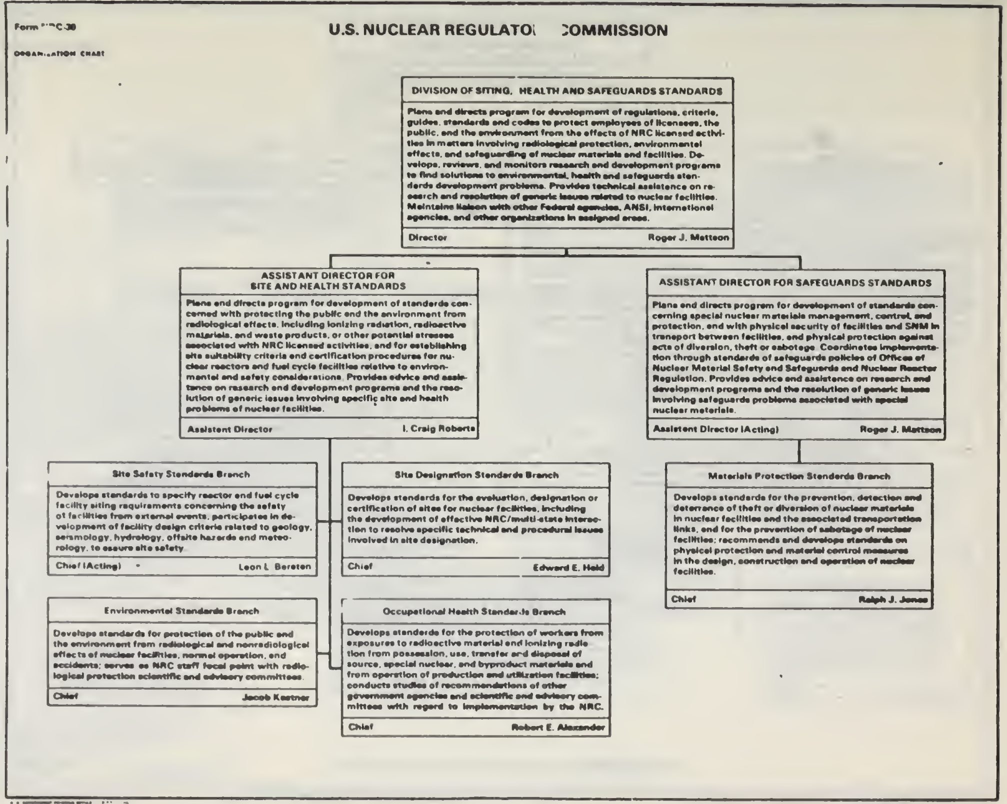
Chief	Carl E. Johnson

DIVISION OF ENGINEERING STANDARDS

(see page 27)

DIVISION OF SITING, HEALTH AND SAFEGUARDS STANDARDS

(see page 28)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ORGANIZATION CHART
U.S. NUCLEAR REGULATO COMMISSION
DIVISION OF SITING, HEALTH AND SAFEGUARDS STANDARDS
Plans and directs program for development of regulations, criteria, guides, standards and codes to protect employees of licensees, the public, and the environment from the effects of NRC licensed activities in matters involving radiological protection, environmental effects, and safeguarding of nuclear materials and facilities. Develops, reviews, and monitors research and development programs to find solutions to environmental, health and safeguards standards development problems. Provides technical assistance on research and resolution of generic issues related to nuclear facilities. Maintains liaison with other Federal agencies, ANSI, international agencies, and other organizations in assigned areas.
Director Roger J. Mattson
ASSISTANT DIRECTOR FOR SITE AND HEALTH STANDARDS
Plans and directs program for development of standards concerned with protecting the public and the environment from radiological effects, including ionizing radiation, radioactive materials, and waste products, or other potential stresses associated with NRC licensed activities, and for establishing site suitability criteria and certification procedures for nuclear reactors and fuel cycle facilities relative to environmental and safety considerations. Provides advice and assistance on research and development programs and the resolution of generic issues involving specific site and health problems of nuclear facilities.
Assistant Director I. Craig Roberts
ASSISTANT DIRECTOR FOR SAFEGUARDS STANDARDS
Plans and directs program for development of standards concerning special nuclear materials management, control, and protection, and with physical security of facilities and SNM in transport between facilities, and physical protection against acts of diversion, theft or sabotage. Coordinates implementation through standards of safeguards policies of Offices of Nuclear Material Safety and Safeguards and Nuclear Reactor Regulation. Provides advice and assistance on research and development programs and the resolution of generic issues involving safeguards problems associated with special nuclear materials.
Assistant Director (Acting) Roger J. Mattson
Site Safety Standards Branch
Develops standards to specify reactor and fuel cycle facility siting requirements concerning the safety of facilities from external events, participates in development of facility design criteria related to geology, seismology, hydrology, offsite hazards and meteorology, to assure site safety.
Chief (Acting) Leon L. Beratan
Site Designation Standards Branch
Develops standards for the evaluation, designation or certification of sites for nuclear facilities, including the development of effective NRC/multi-state interaction to resolve specific technical and procedural issues involved in site designation.
Chief Edward E. Held
Materials Protection Standards Branch
Develops standards for the prevention, detection and deterrance of theft or diversion of nuclear materials in nuclear facilities and the associated transportation links, and for the prevention of sabotage of nuclear facilities; recommends and develops standards on physical protection and material control measures in the design, construction and operation of nuclear facilities.
Chief Ralph J. Jones
Environmental Standards Branch
Develops standards for protection of the public and the environment from radiological and nonradiological effects of nuclear facilities, normal operation, and accidents; serves as NRC staff focal point with radiological protection scientific and advisory committees.
Chief Jacob Kastner
Occupational Health Standards Branch
Develops standards for the protection of workers from exposures to radioactive material and ionizing radiation from possession, use, transfer and disposal of source, special nuclear, and byproduct materials and from operation of production and utilization facilities; conducts studies of recommendations of other government agencies and scientific and advisory committees with regard to implementation by the NRC.
Chief Robert E. Alexander
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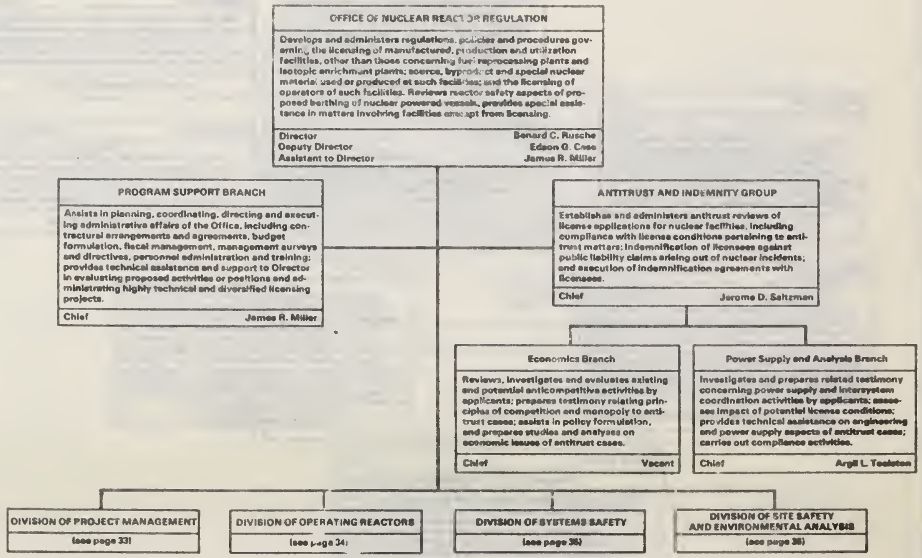
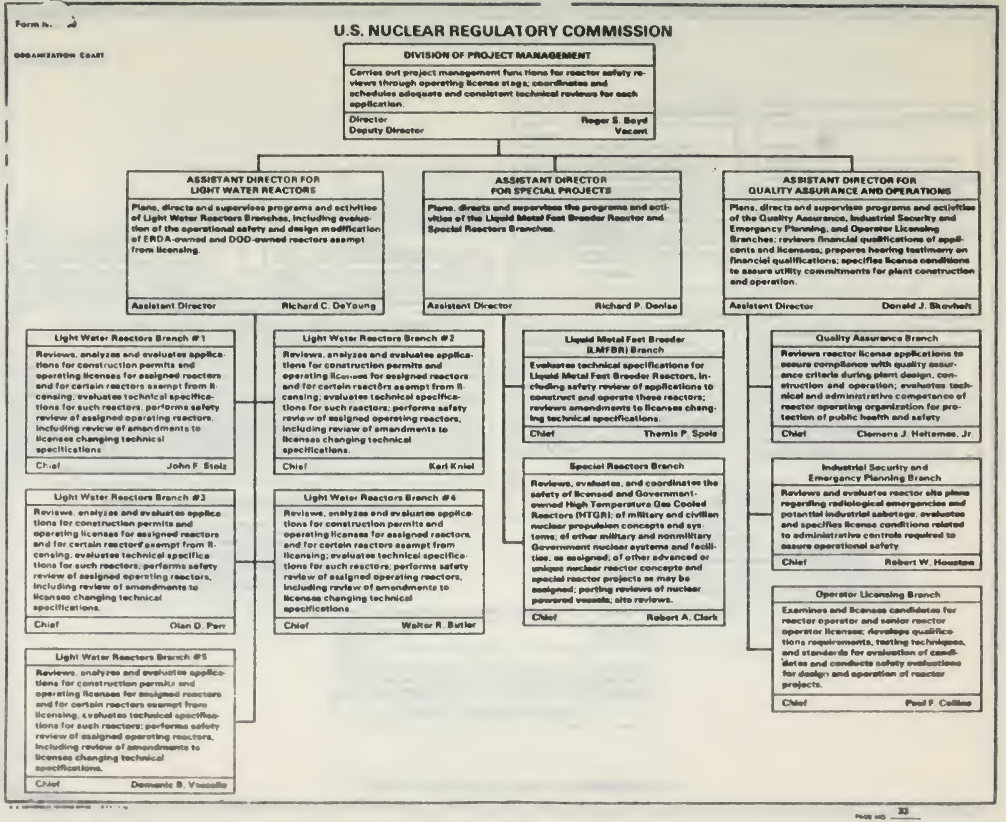
U.S. NUCLEAR REGULATORY COMMISSION

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ORGANIZATION CHART
U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF PROJECT MANAGEMENT
Carries out project management functions for reactor safety reviews through operating license stage; coordinates and schedules adequate and consistent technical reviews for each application.
Director Roger S. Boyd
Deputy Director Vacant
ASSISTANT DIRECTOR FOR LIGHT WATER REACTORS
Plans, directs and supervises programs and activities of Light Water Reactors Branches, including evaluation of the operational safety and design modification of ERDA-owned and DOD-owned reactors exempt from licensing.
Assistant Director Richard C. DeYoung
ASSISTANT DIRECTOR FOR SPECIAL PROJECTS
Plans, directs and supervises the programs and activities of the Liquid Metal Fast Breeder Reactor and Special Reactors Branches.
Assistant Director Richard P. Denise
ASSISTANT DIRECTOR FOR QUALITY ASSURANCE AND OPERATIONS
Plans, directs and supervises programs and activities of the Quality Assurance, Industrial Security and Emergency Planning, and Operator Licensing Branches; reviews financial qualifications of applicants and licensees; prepares hearing testimony on financial qualifications; specifies license conditions to assure utility commitments for plant construction and operation.
Assistant Director Donald J. Skovholt
Light Water Reactors Branch #1
Reviews, analyzes and evaluates applications for construction permits and operating licenses for assigned reactors and for certain reactors exempt from licensing; evaluates technical specifications for such reactors; performs safety review of assigned operating reactors, including review of amendments to licenses changing technical specifications
Chief John F. Stolz
Light Water Reactors Branch #2
Reviews, analyzes and evaluates applications for construction permits and operating licenses for assigned reactors and for certain reactors exempt from licensing; evaluates technical specifications for such reactors; performs safety review of assigned operating reactors, including review of amendments to licenses changing technical specifications.
Chief Karl Kniel
Light Water Reactors Branch #3
Reviews, analyzes and evaluates applications for construction permits and operating licenses for assigned reactors and for certain reactors exempt from licensing; evaluates technical specifications for such reactors; performs safety review of assigned operating reactors, including review of amendments to licenses changing technical specifications.
Chief Olan D. Parr
Light Water Reactors Branch #4
Reviews, analyzes and evaluates applications for construction permits and operating licenses for assigned reactors, and for certain reactors exempt from licensing; evaluates technical specifications for such reactors; performs safety review of assigned operating reactors, including review of amendments to licenses changing technical specifications
Chief Walter R. Butler
Light Water Reactors Branch #5
Reviews, analyzes and evaluates applications for construction permits and operating licenses for assigned reactors and for certain reactors exempt from licensing; evaluates technical specifications for such reactors; performs safety review of assigned operating reactors, including review of amendments to licenses changing technical specifications.
Chief Domenic B. Vassallo
Liquid Metal Fast Breeder (LMFBR) Branch
Evaluates technical specifications for Liquid Metal Fast Breeder Reactors, including safety review of applications to construct and operate these reactors; reviews amendments to licenses changing technical specifications.
Chief Themis P. Speis
Special Reactors Branch
Reviews, evaluates, and coordinates the safety of licensed and Government-owned High Temperature Gas Cooled Reactors (HTGR); of military and civilian nuclear propulsion concepts and systems; of other military and nonmilitary Government nuclear systems and facilities, as assigned; of other advanced or unique nuclear reactor concepts and special reactor projects as may be assigned; porting reviews of nuclear powered vessels; site reviews.
Chief Robert A. Clark
Quality Assurance Branch
Reviews reactor license applications to assure compliance with quality assurance criteria during plant design, construction and operation; evaluates technical and administrative competence of reactor operating organization for protection of public health and safety
Chief Clemens J. Heltemes, Jr
Industrial Security and Emergency Planning Branch
Reviews and evaluates reactor site plans regarding radiological emergencies and potential industrial sabotage; evaluates and specifies license conditions related to administrative controls required to assure operational safety
Chief Robert W. Houston
Operator Licensing Branch
Examines and licenses candidates for reactor operator and senior reactor operator licenses; develops qualifications requirements, testing techniques, and standards for evaluation of candidates and conducts safety evaluations for design and operation of reactor projects.
Chief Paul F. Collins
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ORGANIZATION CHART

U. S. NUCLEAR REGULATORY COMMISSION

DIVISION OF OPERATING REACTORS

Reviews the design and operational changes in operating reactors; analyzes and responds to operating experiences as they develop; and assures that current experience is factored into new licensing actions.

Director — Victor Stello
Deputy Director — Joe W. Reece

ASSISTANT DIRECTOR FOR OPERATING REACTORS

Plans, directs and supervises the programs and activities of the Operating Reactors Branches, including evaluation of operational safety and design modification of ERDA-owned and DOD-owned reactors exempt from licensing.

Assistant Director — Karl R. Goller

Operating Reactors Branch #1

Reviews overall technical procedural aspects of licensed operating reactors, and proposed amendments to operating licenses; evaluates office activities pertaining to processing of applications for construction permits and operating licenses for research and test reactors and critical facilities.

Chief — Robert A. Purple

Operating Reactors Branch #2

Reviews overall technical procedural aspects of licensed operating reactors, and proposed amendments to operating licenses; evaluates office activities pertaining to processing of applications for construction permits and operating licenses for research and test reactors and critical facilities.

Chief — Dennis L. Ziemann

Operating Reactors Branch #3

Reviews overall technical procedural aspects of licensed operating reactors, and proposed amendments to operating licenses, evaluates office activities pertaining to processing of applications for construction permits and operating licenses for research and test reactors and critical facilities.

Chief — George E. Lear

Operating Reactors Branch #4

Reviews overall technical procedural aspects of licensed operating reactors, and proposed amendments to operating licenses; evaluates office activities pertaining to processing of applications for construction permits and operating licenses for research and test reactors and critical facilities.

Chief — Robert W. Reid

ASSISTANT DIRECTOR FOR OPERATIONAL TECHNOLOGY

Plans, directs and supervises the programs and activities of the Engineering, Reactor Safety, Plant Systems, and Environmental Evaluation Branches.

Assistant Director — Darrell G. Eisenhut

Engineering Branch

Reviews, evaluates and analyzes the engineering safety review of structural and mechanical components involving mechanical engineering, structural engineering, and materials engineering disciplines, for all reactor facilities licensed for operation, the evaluation of applications and issuance of construction permits and operating licenses for nonpower reactors, and of operational and design modifications of ERDA and DOD-owned operating facilities exempt from licensing as requested.

Chief — Lawrence C. Shao

Reactor Safety Branch

Reviews, evaluates and analyzes the engineering safety aspects of the reactor core, reactor coolant systems, engineered safety features, accidents and transients, involving thermodynamic, fuels, nuclear physics, and system design disciplines, for all reactor facilities licensed for operation, applications and issuance of construction permits and operating licenses for nonpower reactors; operational and design modifications of ERDA and DOD-owned operating facilities exempt from licensing as requested.

Chief — Robert L. Baer

Plant Systems Branch

Reviews, evaluates, and coordinates the technical safety review of containment systems, control systems, power conversion systems, auxiliary systems, electrical systems, and all other safety related instrumentation for all reactor facilities licensed for operation, all applications to construct and operate nonpower reactors, including modifications to plant systems, and, as requested, of operational and design modifications of ERDA and DOD-owned reactor facilities exempt from licensing.

Chief — Albert Schwencer

Environmental Evaluation Branch

Reviews, evaluates and coordinates the environmental and safety review of radioactive waste treatment methods and effluents, radiological accident analyses, radiation protection, and overall environmental assessments for all reactor facilities licensed for operation; of all applications to construct and operate nonpower reactors; of operational and design modifications of ERDA and DOD-owned reactor facilities exempt from licensing as requested.

Chief — Brian K. Grimes

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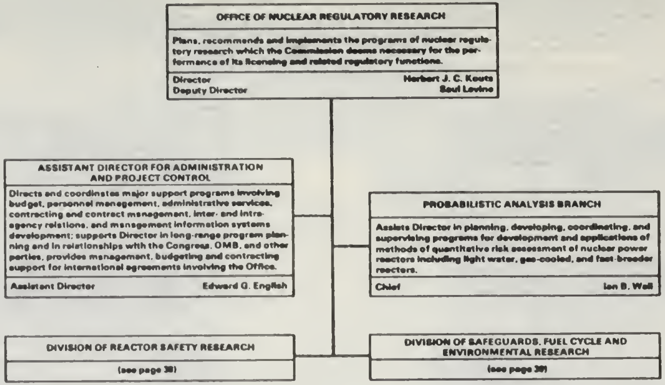
U. S. NUCLEAR REGULATO COMMISSION



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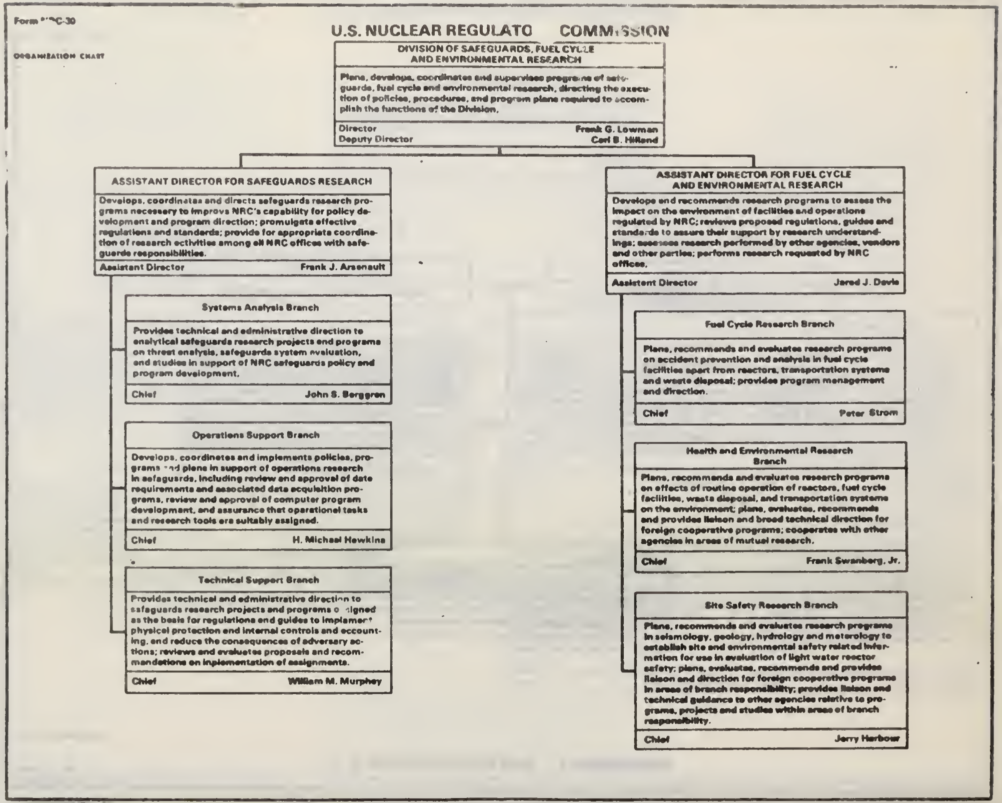
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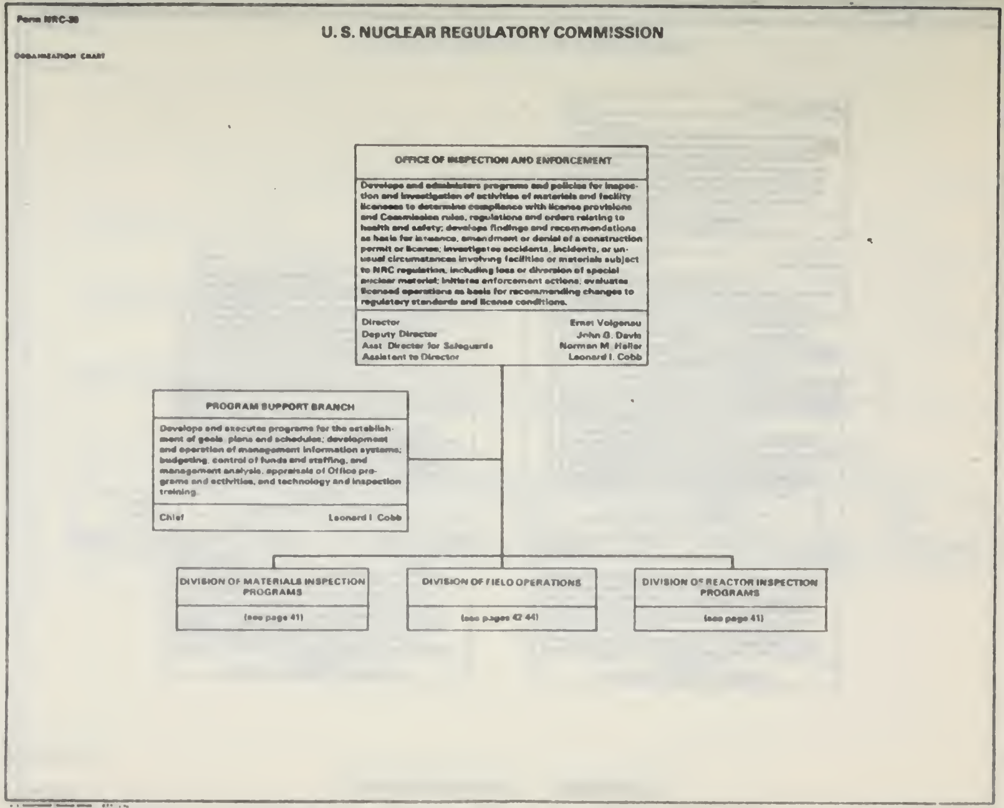
ORGANIZATION CHART
U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF SAFEGUARDS, FUEL CYCLE AND ENVIRONMENTAL RESEARCH
Plans, develops, coordinates and supervises programs of safeguards, fuel cycle and environmental research, directing the execution of policies, procedures, and program plans required to accomplish the functions of the Division.
Director Frank G. Lowman
Deputy Director Carl B. Hilland
ASSISTANT DIRECTOR FOR SAFEGUARDS RESEARCH
Develops, coordinates and directs safeguards research programs necessary to improve NRC's capability for policy development and program direction; promulgate effective regulations and standards; provide for appropriate coordination of research activities among all NRC offices with safeguards responsibilities.
Assistant Director Frank J. Arsenault
Systems Analysis Branch
Provides technical and administrative direction to analytical safeguards research projects and programs on threat analysis, safeguards system evaluation, and studies in support of NRC safeguards policy and program development.
Chief John S. Berggren
Operations Support Branch
Develops, coordinates and implements policies, programs and plans in support of operations research in safeguards, including review and approval of data requirements and associated data acquisition programs, review and approval of computer program development, and assurance that operational tasks and research tools are suitably assigned.
Chief H. Michael Hawkins
Technical Support Branch
Provides technical and administrative direction to safeguards research projects and programs designed as the basis for regulations and guides to implement physical protection and internal controls and accounting, and reduce the consequences of adversary actions; reviews and evaluates proposals and recommendations on implementation of assignments.
Chief William M. Murphey
ASSISTANT DIRECTOR FOR FUEL CYCLE AND ENVIRONMENTAL RESEARCH
Develops and recommends research programs to assess the impact on the environment of facilities and operations regulated by NRC; reviews proposed regulations, guides and standards to assure their support by research understandings; assesses research performed by other agencies, vendors and other parties; performs research requested by NRC offices.
Assistant Director Jared J. Davis
Fuel Cycle Research Branch
Plans, recommends and evaluates research programs on accident prevention and analysis in fuel cycle facilities apart from reactors, transportation systems and waste disposal; provides program management and direction.
Chief Peter Strom
Health and Environmental Research Branch
Plans, recommends and evaluates research programs on effects of routine operation of reactors, fuel cycle facilities, waste disposal, and transportation systems on the environment; plans, evaluates, recommends and provides liaison and broad technical direction for foreign cooperative programs; cooperates with other agencies in areas of mutual research.
Chief Frank Swanberg, Jr.
Site Safety Research Branch
Plans, recommends and evaluates research programs in seismology, geology, hydrology and meteorology to establish site and environmental safety related information for use in evaluation of light water reactor safety; plans, evaluates, recommends and provides liaison and direction for foreign cooperative programs in areas of branch responsibility; provides liaison and technical guidance to other agencies relative to programs, projects and studies within areas of branch responsibility.
Chief Jerry Harbour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ORGANIZATION CHART
U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
Develops and administers programs and policies for inspection and investigation of activities of materials and facility licensees to determine compliance with license provisions and Commission rules, regulations and orders relating to health and safety; develops findings and recommendations as basis for issuance, amendment or denial of a construction permit or license; investigates accidents, incidents, or unusual circumstances involving facilities or materials subject to NRC regulation, including loss or diversion of special nuclear material; initiates enforcement actions; evaluates licensed operations as basis for recommending changes to regulatory standards and license conditions.
Director Ernst Volgenau
Deputy Director John G. Davis
Asst. Director for Safeguards Norman M. Haller
Assistant to Director Leonard I. Cobb
PROGRAM SUPPORT BRANCH
Develops and executes programs for the establishment of goals, plans and schedules; development and operation of management information systems; budgeting, control of funds and staffing, and management analysis, appraisals of Office programs and activities, and technology and inspection training.
Chief Leonard I. Cobb
DIVISION OF MATERIALS INSPECTION PROGRAMS
(see page 41)
DIVISION OF FIELD OPERATIONS
(see pages 42-44)
DIVISION OF REACTOR INSPECTION PROGRAMS
(see page 41)

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ORGANIZATION CHART

U. S. NUCLEAR REGULAT / COMMISSION

DIVISION OF MATERIALS INSPECTION PROGRAMS

Develops and issues criteria, standards and guides relating to inspections and investigations of licensee facilities and activities in areas of radiological and environmental protection, fuel facility construction and operations, safeguarding fissile material, and prevention of sabotage of nuclear facilities; provides technical assistance in these areas to Headquarters and Regional Offices; reviews and comments on proposed regulatory standards and guides in these areas of responsibility.

Director — Harold D. Thornburg

Safety and Environmental Program Branch

Develops and recommends criteria, standards and guides for inspections of licensee programs for radiological safety, environmental protection and fuel operation, evaluates results of these programs; reviews and comments on proposed regulatory standards and guides and provides technical assistance in areas of branch responsibility.

Chief — Leo B. Higginbotham

Safeguards Branch

Develops and recommends criteria, standards and guides for inspections of licensee programs for safeguarding fissile material and for preventing sabotage of nuclear facilities; evaluates results of these programs; reviews and comments on proposed regulatory standards and guides and provides technical assistance in areas of branch responsibility.

Chief — James G. Whitesker

DIVISION OF REACTOR INSPECTION PROGRAMS

Develops and issues criteria, standards and guides relating to inspections and investigations of licensee facilities and activities in areas of quality assurance programs, design, procurement, construction, testing and operation of reactors; provides technical assistance in these areas to Headquarters and Regional Offices; represents the Office at ACRS meetings; reviews and comments on proposed regulatory standards and guides relating to areas of assigned responsibility.

Director — Boyce H. Grier

Light Water Reactor Programs Branch

Develops and recommends criteria, standards and guides for inspections and investigations of licensee light water reactors and related activities in areas of quality assurance, construction, testing and operations; evaluates results of these programs; reviews and comments on proposed regulatory standards and guides in areas of responsibility.

Chief — James H. Sniezek

Reactor Technical Assistance Branch

Provides highly specialized technical assistance to Headquarters and Regional Offices in areas of significant enforcement and inspection cases, abnormal occurrences and construction deficiencies, and presentations to the ACRS; works with Offices of Nuclear Reactor Regulation and Standards Development in development of agency position on complex cases.

Chief — Karl V. Seyfrit

Vendors and Advanced Reactor Programs Branch

Develops and recommends criteria, standards and guides relating to inspection and investigation of gas-cooled reactors, liquid metal fast breeder reactors, enrichment facilities, architect-engineers, nuclear steam system suppliers, and component vendors; evaluates these programs; reviews and comments on proposed regulatory guides and standards in areas of assigned responsibility.

Chief — George W. Reinmuth

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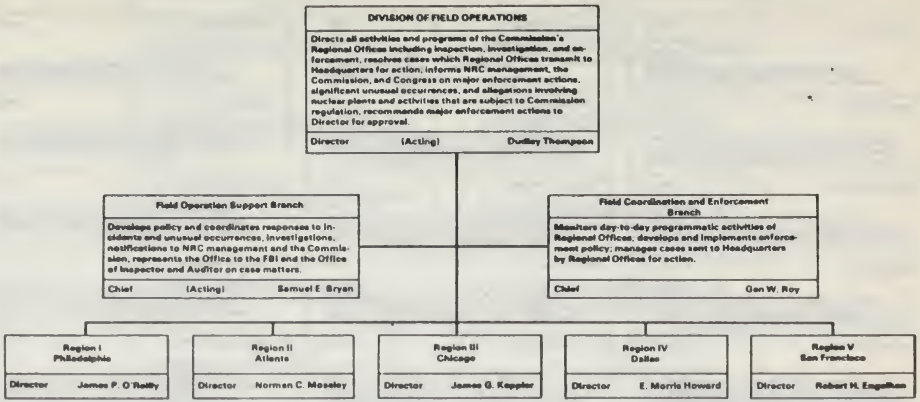
U.S. NUCLEAR REGULATORY COMMISSION



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U. S. NUCLEAR REGULAT[illegible]Y COMMISSION

REGION I	REGION II	REGION III
Office of the Director-directs all Region activities including inspections, investigations, enforcement actions and independent measurements of plant effluents. Director — James P. O'Reilly	Office of the Director-directs all Region activities including inspections, investigations, enforcement actions and independent measurements of plant effluents. Director — Norman C. Moseley	Office of the Director-directs all Region activities including inspections, investigations, enforcement actions and independent measurements of plant effluents. Director — James G. Keppler
Reactor Operations and Nuclear Support Branch-inspections and investigations of reactors and critical assembling in testing or startup status and with operating licenses Chief — Eldon J. Brunner	Reactor Operations and Nuclear Support Branch-inspections and investigations of reactors and critical assembling in testing or startup status and with operating licenses. Chief — Francis J. Long	Reactor Operations and Nuclear Support Branch-inspections and investigations of reactors and critical assembling in testing or startup status and with operating licenses. Chief — Gaston Fiorelli
Reactor Construction and Engineering Support Branch-inspections and investigations of reactors under construction; technical support on operating reactors. Chief — Robert T. Carlson	Reactor Construction and Engineering Support Branch-inspections and investigations of reactors under construction, technical support on operating reactors. Chief — Charles E. Murphy	Reactor Construction and Engineering Support Branch-inspections and investigations of reactors under construction; technical support on operating reactors. Chief — Doyle M. Hunnicutt
Fuel Facility and Materials Safety Branch-inspections of radiological and environmental protection programs of licensees and fuel facility construction and operation. Chief — Paul R. Nelson	Fuel Facility and Materials Safety Branch-inspections of radiological and environmental protection programs of licensees and fuel facility construction and operation. Chief — Jack T. Sutherland	Fuel Facility and Materials Safety Branch-inspections of radiological and environmental protection programs of licensees and fuel facility construction and operation. Chief — James M. Allan
Safeguards Branch-inspections and investigations of licensee protection of facilities and materials Chief — Walter G. Martin	Safeguards Branch-inspections and investigations of licensee protection of facilities and materials. Chief — William B. Kenna	Safeguards Branch-inspections and investigations of licensee protection of facilities and materials. Chief — John A. Hind

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ORGANIZATION CHART

U. S. NUCLEAR REGULATORY COMMISSION

REGION IV	REGION V
Office of the Director-directs all Region activities including inspections, investigations, enforcement actions and independent measurements of plant effluents. Director — Elbert M. Howard	Office of the Director-directs all Region activities including inspections, investigations, enforcement actions and independent measurements of plant effluents. Director — Robert H. Engelken
Reactor Operations and Nuclear Support Branch-inspections and investigations of reactors and critical assembling in testing or startup status and with operating licenses. Chief — Glen L. Madsen	Reactor Operations and Nuclear Support Branch-inspections and investigations of reactors and critical assembling in testing or startup status and with operating licenses. Chief — J. L. Crews
Reactor Construction and Engineering Support Branch-inspections and investigations of reactors under construction; technical support on operating reactors. Chief — Vacant	Reactor Construction and Engineering Support Branch-inspections and investigations of reactors under construction; technical support on operating reactors. Chief — George S. Spencer
Fuel Facility and Materials Safety Branch-inspections of radiological and environmental protection programs of licensees and fuel facility construction and operation. Chief — Glen D. Brown	Fuel Facility and Materials Safety Branch-inspections of radiological and environmental protection programs of licensees and fuel facility construction and operation. Chief — Herbert E. Book
Vendor Inspection Branch-inspection and investigation of enrichment facilities, nuclear steam suppliers, architect-engineers, and component vendors. Chief — Joseph M. Tillou	Safeguards Branch-inspections and investigations of licensee protection of facilities and materials. Chief — Vincent H. Rizzolo

XII. Request Pertaining to Reactor Safety Study Hearings

July 9, 1976

Honorable Marcus A. Rowden
Commissioner
Nuclear Regulatory Commission
Washington, D.C. 20555

COPY

Dear Mr. Rowden:

At the Subcommittee's recent hearing on the Reactor Safety Study, one of the matters of concern was whether the report, and particularly its executive summary, contained an implied conclusion that the hazards associated with operation of light water reactors were so small as to be 'acceptable'. While I am aware that the Study states that such value judgments are not its intent, the manner in which the executive summary is laid out can readily convey a contrary impression.

The impression of a value judgment was also conveyed to the Congress during the debate last fall on extension of the Price-Anderson Act. At that time, the Reactor Safety Study was cited to support the contention that the Act's liability limitations had no practical significance owing to the improbability of an accident occurring in which damage would exceed the specified limits.

This raises a matter of continuing concern to the Subcommittee, namely the role of the Nuclear Regulatory Commission in the legislative process. I would appreciate, therefore, your providing for the hearing record a statement addressing the question of whether the decision to publish and release the final draft of the Reactor Safety Study (NUREG 75-014) prior to peer review was influenced by the forthcoming debate on Price-Anderson renewal.

Sincerely,

Jonathan B. Bingham

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OFFICE OF THE CHAIRMAN

September 17, 1976

The Honorable Jonathan B. Bingham
United States House of Representatives
Washington, D.C. 20515

Dear Congressman Bingham:

This is in reply to your inquiry on "whether the decision to publish and release the final draft of the Reactor Safety Study ... prior to peer revie was influenced by the (then) forthcoming debate on Price-Anderson renewal."

The Commission was aware of Congressional interest in having the Reactor Safety Study's final report during its deliberations on the extension of the Price-Anderson legislation, and when the Study was completed, the pendency of Congressional debate on this matter was a factor in the timing of the report's release. However, it has been and remains our view that there is no direct connection between the report and the need for this legislation.

The charter of the Reactor Safety Study was to make a technical assessment of the potential accident risks in nuclear plants. In fact, the report does not address the need for Price-Anderson coverage. Our support for P.L. 94-197 has been based on the view that it is necessary to provide assurance of an adequate level of readily available financial protection for the public in the unlikely event of a large nuclear power plant accident, while at the same time providing for an orderly changeover from government indemnification to private coverage.

WASH-1400, released in October 1975, was published in final form; it was not a "final draft" as your letter terms it, but the final report of a completed engineering study. Further, it was not published prior to peer review, but was in fact issued only after the draft had received an unusually extensive peer review. Some 90 organizations and individuals representing a broad spectrum of society and many diverse viewpoints and expertise contributed about 1800 pages of comments, many of a highly technical nature. In the preparation of the final report, detailed consideration was given to the peer review comments received on the draft, and appropriate changes were made in converting the draft into the final report. Furthermore, those comments were made publicly available and were carefully analyzed and discussed in a new Appendix XI to the final report.

The Nuclear Regulatory Commission's review of the final report indicated that it has indeed been responsive to the comments received and that a major effort was made to correct the errors noted by the comments on the draft report. More specifically, the principal comments of the APS study group and the EPA were that the draft report underestimated the health effects that could occur from potential reactor accidents. The final report reflects modifications from the draft report to account for the effects of these comments. Moreover, to assure that the health effects computations in the final report would be soundly based, a consulting group of some of the most distinguished scientists in the country in the area of radiation health effects was formed to provide advice to the study team. This group was unanimous in its support of the model used.

In regard to the schedule for publication of the final report of the Reactor Safety Study, the original plan was to finish the study in June of 1975. However, it soon became apparent that the development of a new and improved consequence model could not be completed in that time frame and the schedule was delayed until October. While the Reactor Safety Study Group had earlier believed it might be useful to discuss the health effects area with some members of the APS study and the EPA prior to publication of the final report, as the new consequence model was developed, it became apparent that the potential usefulness of such discussions diminished because virtually all of the recommendations on the draft with respect to health effects had been adopted and because, as mentioned earlier, the advice received from the health effects consultants had been unanimous.

Furthermore, no significant new issues concerning the report were raised either by the EPA or by Dr. Panofsky during the June 11, 1976 hearings before the Subcommittee. Essentially, each criticism that was brought up at the hearing had been previously discussed in detail in Appendix XI.

Finally, I would like to emphasize that great diligence was taken not to impose value judgments on the data presented in WASH-1400. The purpose of the study was to estimate the risks to the public from potential accidents; no judgments were made as to the acceptability of these risks. The data and conclusions drawn from the data were, I believe, stated accurately, fairly and without bias. Your criticism was particularly directed at the presentation of the data in the Study's Executive Summary. As I am sure you are aware, it is extremely difficult to summarize a highly complex technical work of 2,300 pages in 12 pages that can be easily read and comprehended by the general public. It is

the Commission's view that the Executive Summary of the report is a fair and accurate explanation, in layman's terms, of the full study.

I hope that this letter is responsive to your request.

Sincerely,

Marcus A. Rowden
Marcus A. Rowden
Chairman

XIII. Emergency Planning

79-679 O - 76 - 17

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

October 11, 1976

COPY

The Honorable
Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D. C. 20515

Dear Marc:

The Subcommittee has received suggestions that it conduct hearings on the matter of emergency planning for situations in which radioactive materials might be released from nuclear power plants. In order that we might determine the need for such hearings, I would appreciate your providing by November 15 the following information:

1. A statement of NRC policy with regard to emergency planning that must be undertaken prior to issuance of a nuclear power plant operating license. (This statement should indicate the nature of any agreements that the facility operator is required to establish with state and local authorities prior to issuance of an operating license. Please furnish copies of all such agreements.)

2. A specification of criteria by which the NRC judges the adequacy of emergency plans for situations in which radioactive materials might escape from a power reactor site.

3. A statement of NRC policy with regard to testing of emergency plans for power reactors, and the extent to which such testing is monitored by NRC officials. (Please provide copies of all reports on testing of emergency plans.)

The Honorable
Marcus A. Rowden

October 11, 1976

4. A statement of findings with regard to how various facilities' emergency plans satisfy the NRC criteria.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy
and the Environment

Response to October 11, 1976 letter
not received as of date of printing.

XIV. Pressure Vessel Overpressurization

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

October 22, 1976

The Honorable
Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Marc:

I am disturbed by recent allegations of unsafe conditions and of lax enforcement of safety regulations with regard to pressurized water reactors. Incidents of this kind, whether or not they are based in substance, undermine confidence in the ability of the NRC to protect adequately the public health and safety. I believe it vital that the NRC respond at the earliest date to Mr. Fluegge's charges. If these charges are determined to have merit, it is important that disciplinary actions be taken against the responsible parties.

In order that I might improve my understanding of the current issue, I would appreciate your providing the following information by October 29:

1. A tabulation of overpressurization incidents that have occurred since 1970. For each incident please specify peak pressure in the pressure vessel, maximum pressure allowed by regulations for the temperature conditions existing at the time, and the estimated pressure at which that particular pressure vessel would fail at those temperature conditions.

2. A listing of measures proposed to prevent overpressurization incidents and the schedule for such measures to be placed in effect.

3. An explanation of why measures specified in Item 2 above have not been required previously.

The Honorable
Marcus A. Rowden

October 22, 1976

4. An explanation of what kinds of permanent damage might have resulted from overpressurization incidents. Please indicate, in addition, any plans to determine the extent of such damage in operating reactors, and to institute new operating conditions as a consequence of any such damage that might have occurred.

5. A discussion of the impact of overpressurization incidents upon the Reactor Safety Study conclusion that the probability of gross failure of pressure vessels was sufficiently small as not to be an appreciable contributor to the overall risk. The October 21 AP wire carried a report that Mr. Rusche had said that overpressurization could cause pressure vessel failure. Does the fact that 29 overpressurization incidents have occurred affect the Reactor Safety Study estimate that the median gross failure probability for PWR pressure vessels is approximately 10^{-7} per vessel per year?

On a related matter, I am concerned about continuing reports that NRC staff members believe themselves subjected to pressures to overlook unresolved problems during the course of safety reviews. I am aware, of course, that you and Chairman Anders have enunciated a policy to encourage staff to express concerns about such pressures directly to the Commissioners. Yet, it appears that at least some of the staff feel inhibited with regard to going over the heads of their supervisors. That this attitude persists among NRC staff leads inevitably to a dimunition in public confidence in the safety of nuclear power.

In order to help achieve the necessary level of public and Congressional confidence in the objectivity of the nuclear regulatory process, it may be necessary to establish a new mechanism whereby NRC staff can make known their concerns without jeopardizing their careers. To consider what kinds of institutional arrangements might be required, the Subcommittee will hold hearings on the matter early in the next Congress. I would appreciate your comments on this.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

October 29, 1976

The Honorable Morris K. Udall, Chairman
Subcommittee on Energy and the Environment
Committee on Interior and Insular Affairs
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

Chairman Rowden has asked me to thank you for your letter of October 22, 1976, which was received in the Commission on October 27, 1976. In your letter you expressed some concern relating to the issue of reactor vessel overpressurization raised by Mr. Ronald Fluegge in conjunction with his resignation. The Nuclear Regulatory Commission staff is presently developing a technical report on the subject of reactor vessel overpressurization which we expect will include answers to the questions in your letter. This report is expected to be completed shortly.

When that report is completed, it will be transmitted promptly, and other concerns raised in your letter will also be addressed. However in light of the concern which you expressed for rapid responses to your specific questions, the Chairman has asked me to provide as complete answers as are possible at this time.

In partial response to question number 1 of your letter, I have attached a tabulation of reactor vessel overpressurization incidents that have occurred since 1972. The peak pressure reached in each of the events as well as the maximum pressure allowed for the temperatur existing at the time of the event are indicated. The Licensee Event Reports (LER's) that are required to be submitted to NRC for the events listed are attached and are grouped according to licensee.

With regard to question 2 of your letter, in August of 1976, the NRC staff sent a letter (copy attached) to each of the PWR licensees requesting that they submit an analysis of their system designs to determine the susceptibility to overpressurization events. Any desig modifications determined to be necessary to avoid exceeding the limit of Appendix G to 10 CFR Part 50 were to be included in the analysis. Pending implementation of any design modifications identified, the licensees were advised that it was necessary to implement short-term

measures to reduce the likelihood that overpressurization events will occur until the permanent design changes can be made. The licensees were requested to notify the NRC staff within 20 days of receipt of our letter that they would provide the information requested within 60 days. We have received all of the required 20-day responses from the involved licensees and the majority of the 60-day responses. Copies of these letters are attached. Contained in these responses are the short-term measures that each of the licensees has implemented, or plans to implement as soon as possible. Examples of the short-term measures being employed are as follows:

1. Minimize time while at a water solid condition.

2. Upgrade existing procedures to insure that appropriate warnings and cautions are included to alert the operator to the potential for overpressurization during certain plant evolutions.

3. Removal of power from the motor operators of high pressure injection valves while shut down and while below normal operating temperature and pressure.

4. Removal of power from pressurizer heaters while water solid.

5. Additional training sessions to increase the awareness of operators to the potential for overpressurization.

6. Pressure alarm to alert the operator if system pressure approaches Appendix G limits.

An example of long-term measures that have been proposed is a proposal to use dual setpoints on the power operated relief valve on the pressurizer. The lower setpoint is selected by the reactor operator whenever system temperature and pressure are lowered below 275°F and 500 psig during plant outages.

The NRC staff is currently reviewing those analyses and proposed design modifications that have been received. Priority attention is being given to the older facilities and those facilities which have the highest frequency of overpressurization events. The staff is scheduled to complete its evaluation of all the licensee proposals and to determine the acceptability of those design modifications by the end of the year. The schedule for implementation of the modifications will also be established by that time.

I hope that this information will assist you in understanding our approach to the issues raised by Mr. Fluegge. A complete response to your inquiry will be made when the final staff report on the subject has been completed.

Sincerely,

Carlton Kammerer

Carlton Kammerer, Director
Office of Congressional Affairs

Enclosures:
As stated

	INCIDENT (Date)	CAUSE DESCRIPTION	PRESSURE TRANSIENT FROM (PSIG)	TO	TECH SPEC LIMIT (PSIG)	TIME TO REACH PEAK PRESSURE (minutes)
1.	Beaver Valley Unit No. 1 (2/24/76)	Operator error in transferring electrical buses caused instrument spike isolating letdown from RHR System	400	1000	440 (130 F)*	Note 1
2.	Indian Point Unit No. 2 (2/16/72)	Unknown	420	670	500 (140 F)*	2
3.	Indian Point Unit No. 2 (2/17/72)	Operator isolated letdown without verifying availability of letdown thru RHR system	420	650	500 (180 F)*	2
4.	Indian Point Unit No. 2 (3/8/72)	Reactor coolant pump starting swept cold water thru hot steam generator-pressure increase due to thermal expansion	400	640	500 (115 F)*	1
5.	Indian Point Unit No. 2 (4/6/72)	Operator inadvertently isolated letdown	420	680	500 (170 F)*	2
6.	Indian Point Unit No. 2 (5/18/73)	Closure of certain air operator valves in reactor coolant letdown system caused by freezing of moisture in air supply line.	440	575	500 (130 F)*	Note 1

INCIDENT (Date)	CAUSE DESCRIPTION	PRESSURE TRANSIENT FROM (PSIG)	to	TECH SPEC LIMIT (PSIG)	TIME TO REACH PEAK PRESSURE (min.)
7. Indian Point Unit 2 (1/23/74)	Starting of a single reactor coolant pump caused pressure surge. A nitrogen blanket in the pressurizer to act as a surge volume had been established; however, the amount of nitrogen added to the pressurizer was insufficient.	425	525	500 (190 F)*	Note 1
8. Indian Point Unit No. 2 (2/22/74)	An inadvertent safety injection signal was generated which, by design, caused the accumulator discharge stop valves to open.	150	560	500 (115 F)*	Note 1
9. Oconee Nuclear Station Unit 2 (11/15/73)	During Zero Power Physics testing, test procedure instructions directed operating personnel to increase reactor coolant pressure to approximately 1860 psig violating the limits.	800	1860	1600 (300 F)*	30
10. Palisades (9/1/74)	A procedure "CAUTION" statement was not rigorously adhered to while performing a primary coolant system leak test	---	960	Requires 160 F to pressurize above 885 (150 F)*	---

	INCIDENT (Date)	CAUSE DESCRIPTION	PRESSURE TRANSIENT FROM (PSIG)	TO	TECH SPEC LIMIT (PSIG)	TIME TO REACH PEAK PRESSURE (min.)
11.	Point Beach Unit No. 2 (12/10/74)	Following repair, a safety injection pump was lined up for a test run. However, safety injection pump discharge was not isolated from injecting into the reactor coolant system. Pressure transient caused by starting of SI pump.	345	1400	615 (850) (170 F)*	30 Seconds
12.	Point Beach Unit No. 2 (2/28/76)	Operational reasons required the RHR system to be isolated from the reactor coolant system. Reduced letdown resulted in pressure increase	400	830	615 (160 F)*	Note 1
13.	Prairie Island Unit No. 1 (10/31/73)	Reactor coolant pump starting swept cold water thru hot steam generator-pressure increase due to thermal expansion	420	1100	720 (132 F)*	Note 1
14.	Prairie Island Unit No. 1 (1/16/74)	While conducting Safeguards Logic Train A monthly surveillance test, a SI signal was initiated when a step which puts Train A in TEST was inadvertently missed. The SI signal opened No. 11 accumulator outlet isolation valve. RHR System isolation occurred as designed at 600 psig.	395	840	610 (90 F)*	Note 1

INCIDENT (Date)	CAUSE DESCRIPTION	PRESSURE TRANSIENT FROM (psig)	TO	TECH SPEC LIMIT (Psig)	Time to Reach Peak Pressure (min.)
15. Prairie Island Unit No. 2 (11/27/74)	A test signal injected into the letdown controller instrument loop caused a letdown control valve to go closed. This isolated the letdown path. RHR System automatically isolated.	Note 1	900	800 (155 F)*	Note 1
16. St. Lucie Unit No. 1 (8/12/75)	Letdown isolation valve failed closed when I&C personnel removed cover from sealing relay associated with letdown isolation valve, When relay cover was removed, broken wires on relay became disconnected causing letdown valve to close.	210	600 (660)	520 (105 F)*	Note 1
17. Surry Unit No. 1 (1/28/73)	During process of filling and venting the RCS, "A" accumulator motor operated discharge isolation valve was opened to sweep any air trapped in accumulator discharge line into RCS. The opening of the valve caused the accumulator to cause the increase in RCS pressure.	450	590	500 (80 F)*	1
18. Trojan (7/22/75)	The RHR suction valve from the RCS was closed by an unknown person (i.e., this isolated letdown) while the positive displacement charging pump was operating.	400	3326	520 (between 100 and 105 F)*	10 to 12

	INCIDENT (Date)	CAUSE DESCRIPTION	PRESSURE TRANSIENT FROM (Psig)	TO	TECH SPEC LIMIT (Psig)	Time to Reach Peak Pressure ~~(min.)~~
19.	Turkey Point Unit No. 3 (12/3/74)	In preparation for starting a reactor coolant pump, the operator placed the letdown control valve in automatic in order to increase reactor coolant pressure. At 465 psig the RHR system loop suction isolation valve automatically closed isolating letdown.	50	800	510 (105 F)*	Note 1
20.	Zion Unit No. 1 (6/13/73)	Charging pump 1A, with suction from RWST, was started to increase reactor system pressure. Normal pressure control of continuous charging and letdown was not being used since VCT was unavailable Operator was distracted by a telephone call and left the area of the pump control switch. Unattended pump continued to pressurize system. RHR suction relief valve failed to lift and RHR system later isolated automatically at 600 psig.	110	1290	460 (105 F)*	Note 1
21.	Zion Unit No. 1 (6/3/75)	Operator failed to stop the centrifugal charging pump when he secured the RHR system to replace the RHR suction relief valve. When the RHR system was secured, letdown was also secured.	100	1100	480 (115 F)*	10

INCIDENT (date)	CAUSE DESCRIPTION	PRESSURE TRANSIENT FROM (Psig)	to	TECH SPEC LIMIT (Psig)	TIME to Reach Peak (min).
22. Zion Unit No. 2 (9/18/75)	Station personnel were performing a RHR valve interlock test in which the RHR system is automatically isolated from the reactor coolant system. When the applied test signal reached the setpoint, the RHR isolation valves closed removing the letdown path.	95	1300	450 (88 F)*	15
23. Ginna (1969)	Operator inadvertently isolated letdown while charging. Safety valves relieved to terminate transient.	Note 1	2485	Note 1 (100-150 F)*	Note 1
24. Peach Bottom Unit No. 2 (3/6/74)	Following a main steam line isolation test, portions of the reactor vessel shell temperatures decayed to 125 F while reactor pressure remained at approximately 400 psig.	---	400	250 (125 F)*	
25. Beaver Valley Unit No. 1 (3/5/76)	Instrument Technician tripped wrong B/S during MSP, then OPS placed inverter in service with output breaker open, deenergizing #1 vital bus, causing SIS which isolated letdown.	400	1150	440 (150 F)*	Note 1

INCIDENT (date)	CAUSE DESCRIPTION	PRESSURE TRANSIENT FROM (Psig)	To	TECH SPEC LIMIT (Psig)	TIME TO REACH PEAK PRESSURE (Min.)
26. D. C. Cook Unit No. 1 (4/14/76)	During RPS testing, inadvertent letdown isolation was initiated.	Note 1	1040	470 (110 F)*	Note 1
27. St. Lucie Unit No. 1 (6/17/76)	With Shutdown Cooling System secured, a reactor coolant pump was started. Pressure excursion was due to a rapid heatup (95 to 130 F) of the RCS water from the reactor vessel and coolant piping when it was circulated thru the steam generators.	435	815	520 (100 F)*	1
28. Beaver Valley Unit No. 1 (3/13/76)	Inadvertent safety injection due to Solid State Protection System block failure.	425	495	470 (190 F)*	Less than one minute
29. Indian Point Unit No. 2 (9/12/76)	Instrument air header pressure was lost resulting in closure of letdown valves and opening of both charging path valves with one charging pump running.	400	515	500 (110 F)*	5
30. Indian Point Unit No. 3 (9/30/76)	Spurious closure of RHR pump suction isolation valves isolated letdown while charging.	50	2250	740 (185 F)*	7

NOTE 1 - The available abnormal occurrence report does not provide this information.

* - Temperature of reactor vessel during transient

Additional materials pertaining to the matter are held in the Subcommittee files and the NRC Public Document Room. These materials include:

1. Detailed reports on overpressurization incidents. (Sample report follows. Underlining appeared in documents furnished by NRC to the Subcommittee.)

2. Twenty day responses submitted by PWR licensees to the NRC in which the licensees notified the NRC that they would provide requested information with regard to their analysis of susceptibility of overpressurization events. (Sample licensee response follows.)

Bedlezza

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL
(TEMPORARY FORM)

CONTROL NO: 9579

FILE:

FROM: Portland General Elec. Co. Portland Oregon C. Goodwin, Jr.	DATE OF DOC 8-21-75	DATE REC'D 9-10-75	LTR XX	TWX	RPT	OTHER
TO: R.H. Engelken	ORIG 1 Signed	CC	OTHER	SENT NRC PDR XXX	SENT LOCAL PDR XXXX	
CLASS	UNCLASS XXXX	PROP INFO	INPUT	NO CYS REC'D 1	DOCKET NO: 50-344	

DESCRIPTION:

Ltr. trans the following....

ENCLOSURES:

Report of the Unplanned overpresssrization of the Trojan Nuclear Plant Reactor Coolant Syst ...on 7-22-75.....

(1 cy. Encl. Rec'd)

PLANT NAME: Trojan

FOR ACTION/INFORMATION — VCR9-15-75

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1 – G. ULRIKSON ORNL

PORTLAND GENERAL ELECTRIC COMPANY

Trojan Nuclear Plant
P. O. Box 439
Rainier, Oregon 97048

ELECTRIC BUILDING
621 S.W. ALDER STREET
PORTLAND OREGON 97205

August 21, 1975

9-10-75

Mr. R. H. Engelken
Director
Directorate of Regulatory Operations
Region V
1990 N. California Blvd.
Walnut Creek Plaza
Suite 202
Walnut Creek, California 94596

Dear Mr. Engelken:

TROJAN NUCLEAR PLANT
Docket Number 50-344
Report ______

Enclosed please find a report of the unplanned overpressurization of the Trojan Nuclear Plant Reactor Coolant System.

This was reported to Region V, Directorate of Regulatory Operations, via telephone by me to Mr. Bob Dodds at about 1500 hours on July 22, at which time Mr. Dodds recommended the submission of the attached report within 30 days for informational purposes.

The report will also be issued to the Department of Commerce (Boiler Division) of the State of Oregon and the Department of Energy, State of Oregon.

Very truly yours,

C. Goodwin

C. Goodwin, Jr.
Plant Superintendent
Trojan Nuclear Plant

CG/FR/11
Attachment

LICENSEE EVENT REPORT

CONTROL BLOCK: | | | | | | | (1–6) (PLEASE PRINT ALL REQUIRED INFORMATION)

01	LICENSEE NAME (7–14)	ORTNP1
	LICENSE NUMBER (15–25)	- -
	LICENSE TYPE (26–30)	41110
	EVENT TYPE (31–32)	03
01 CON'T	CATEGORY (57–58)	PO
	REPORT TYPE (59)	L
	REPORT SOURCE (60)	L
	DOCKET NUMBER (61–68)	50-344
	EVENT DATE (69–74)	072275
	REPORT DATE (75–80)	081875

EVENT DESCRIPTION

02 DURING THE TESTING PHASE OF PLANT

03 CONSTRUCTION THE RCS WAS SUBJECTED

04 TO A PRESSURE TRANSIENT WHICH

05 PEAKED AT 3309 PSIG

06

	SYSTEM CODE (9–10)	CAUSE CODE (11)	COMPONENT CODE (12–17)	PRIME COMPONENT SUPPLIER (43)	COMPONENT MANUFACTURER (44–47)	VIOLATION (48)
07	CA	F	VESSEL	N	W120	N

CAUSE DESCRIPTION

08 THE RHR SUCTION VALVE MO 8701 FROM THE RCS

09 WAS CLOSED BY AN UNKNOWN PERSON WHILE

10 THE POSITIVE DISPLACEMENT CHG PMP WAS OPERATING

	FACILITY STATUS (9)	% POWER (10–12)	OTHER STATUS (13–44)	METHOD OF DISCOVERY (45)	DISCOVERY DESCRIPTION (46–80)
11	A	000		A	

	FORM OF ACTIVITY RELEASED (9)	CONTENT OF RELEASE (10)	AMOUNT OF ACTIVITY (11–44)	LOCATION OF RELEASE (45–80)
12			NONE	

PERSONNEL EXPOSURES

	NUMBER (9–11)	TYPE (12)	DESCRIPTION (13–80)
13			NONE

PERSONNEL INJURIES

	NUMBER (9–11)	DESCRIPTION (12–80)
14		

OFFSITE CONSEQUENCES

15

LOSS OR DAMAGE TO FACILITY

	TYPE (9)	DESCRIPTION (10–80)
16		

PUBLICITY

17 NONE

ADDITIONAL FACTORS

18 LETTER DATED AUG.

19

NAME: [signature] PHONE: 503 556 1731

GPO 881-667

REPORT DATE:

August 22, 1975

DOCKET NO.

50-344

OCCURRENCE DATE:

July 22, 1975

FACILITY:

Trojan Nuclear Plant
Rainier, Oregon

IDENTIFICATION OF OCCURRENCE:

Reactor Coolant System Overpressurization

CONDITIONS PRIOR TO OCCURRENCE:

Pre-operational testing. Reactor Coolant System at 400 psig, 100°F, recovery from hydrostatic testing.

On the morning of July 21, the RCS was hydrostatically tested to 3107 psig. Upon completion of the hydro, the RCS pressure was reduced to 400 psig. The Residual Heat Removal System (RHR) was lined up to take a suction from the RCS through valves MO-8701 and MO-8702 and discharge to all four cold legs of the RCS and through the RHR letdown valve HCV-128 to the Chemical and Volume Control System (CVCS). RCS pressure was being maintained through the use of letdown pressure control valve CV-131 and the positive displacement charging pump discharging to the normal and alternate charging lines and the pressurizer auxiliary spray line. CV-131 and the positive displacement charging pump speed controller were in manual control. The RCS temperature was being maintained between 100°F and 110°F. The RCS pressure was being monitored on RCS pressure indicator PI-403 and RHR pressure indicators PI-614 and PI-615. The RHR suction relief valve PSV-8708 and RHR System discharge relief valve PSV-8856B were gagged. These were gagged for a previous construction hydro and were never restored. RHR System discharge relief valves PSV-8709 and 8856A were operational. The pressurizer safety valves were removed for the hydrostatic test and the pressurizer power operated relief valve PCV-455A was mechanically blocked from opening since it was not needed for the hydro. Pressurizer power operated relief valve PCV-456 was set to relieve at 3115 psig. The charging pump discharge relief valve PSV-8118 was gagged because the setpoint was below the hydro pressure and a temporary relief valve set at 3450 psig was installed.

The systems were operated in the above configuration following the hydrostatic test into the morning of July 22. At about 1030 on July 22, the pressurizer power operated relief valve PCV-456 was isolated from the RCS by closing block valve MO-8000B to restore the relief valve to its normal setpoint after the hydro. At about the same time craftsmen were removing temporary jumpers installed as part of the hydrostatic test procedure from the CVCS letdown isolation valves and orifice isolation valves. At about 1150, the

Volume Control Tank (VCT) of the CVCS was vented to allow reinstallation of the charging pump relief valve PSV-8118. While venting the VCT, the operator noted that the indicated VCT level dropped from 60% to about 40%. Makeup valve FCV-111B to the VCT was opened to increase VCT level. It was during the VCT filling evolution at about 1200 that the operator noted that RHR pump discharge pressure indication on PI-614 and PI-615 was 0 psi, the RHR pump flow was 0, the letdown flow was 0, the letdown pressure was 0, the RHR pump recirculating valve was open, and the RHR pump suction valve MP-8701 from the RCS was closed. The RHR pump was manually tripped. At approximately 1202, the operator noticed that pressurizer pressure PI-403 was at the maximum scale of 3000 psig. The operator tripped the positive displacement charging pump control switch; however, the computer printout indicates the charging pump had already auto tripped. Shortly thereafter, PI-403 came back on scale decreasing.

DESCRIPTION OF OCCURRENCE:

Reactor Coolant System pressurized to approximately 3300 psig, system unprotected by relief valves.

DESIGNATION OF APPARENT CAUSE OF OCCURRENCE:

Unauthorized closure of residual heat removal system loop suction valve.

ANALYSIS OF OCCURRENCE:

A chronology of events is attached, the RCP seal leakoff flow recorders clearly indicate the initiation of the event and its duration. The times on the recorders, however, do not agree with the computer data or the times observed by the operator. This could be the result of an individual unreeling some chart and, when reeling it back, advancing the paper. The fact that the seal flows do respond as shown on the recorders to letdown isolation was verified on 7/23/75 by closing the RHR pump discharge to the RCS with the positive displacement charging pump operating. The resultant seal flow from this test showed the same characteristics as was shown during the overpressurization incident.

From the seal leakoff recorders, the transient took from 10 to 16 minutes depending on which RCP leakoff flow is examined. By not including the unexplained spike in the leakoff of number 4 RCP low range leakoff flow recorder, the time from initiation to reach the peak pressure is 10 to 12 minutes.

The computer analog trend recorder was monitoring letdown heat exchanger outlet temperature. The recorder indicates the initiation of a significant trend at 1145 with the temperature increasing until 1201. This increase was most likely due to MO-8701 closing and the resulting system recirculation causing the water to heat up. The computer trend recorder shows some temperature spikes at about 1156 which correspond to the computer alarm printout indicating pressure spikes in the

letdown system. These spikes in the temperature and pressure probably were the result of the RHR pump cavitating as it nears its NPSH limit or from the letdown pressure control valve cycling as it attempted to maintain pressure. The letdown temperature at 1201 corresponds to the operator tripping the RHR pump.

The possibility that the RHR suction valve MO-8701 may have closed as a result of a high reactor system pressure initiated by some other event was investigated, since MO-8701 normally has an auto close circuit which closes the valve at an RCS pressure of 600 psi and an interlock feature which prevents its opening with an RCS pressure above 450 psi. Subsequent testing confirmed that a high pressure from either PT-403 or PT-405 would not cause MO-8701 to close. The valve can be closed from the Control Room or from the local control station at the breaker on MCC B21.

The control circuit for MO-8701 was examined to determine if there had been a spurious valve operation caused by arcing, striking contacts, shorted contacts, etc. No evidence of this nature was found. It is believed that the valve was closed from the local control panel by an unauthorized person.

Based on the trends shown by the recorders and the subsequent testing of MO-8701, the event was initiated between 1145 and 1150 by the closure of MO-8701.

The only recorded primary system pressure during the incident is from the computer. The alarm typewriter printout shows that at 1159 primary system pressure was 3217.7 psig. The trend typewriter shows that at 1201 and 10 seconds, the system pressure was 3301 psig and went out of range on the computer calibration. At 1202, the alarm typewriter indicates primary system pressure was 3301 psig decreasing after the charging pump tripped, and at 1204 the pressure had dropped to 3141 psig.

Subsequent to the incident, the calibration of pressure transmitter PT-457 was checked and it was found that for a computer pressure reading of 3301 psig, the actual pressure was 3309.5. The transmitter is located at elevation 71'2". Correcting for the elevation difference, this pressure corresponds to 3311.3 psig at the vessel flange (elevation 67'1") and 3326.2 psig at the vessel bottom (34'4-11/32" below the vessel flange). This established the theoretical maximum pressure that would have been seen at the positive displacement charging pump discharge is 3450 psig, the temporary relief valve setting. A visual examination of the temporary charging pump relief valve and the area around the valve immediately after the incident verified that the relief valve did not lift.

The alarm typewriter printout shows that the positive displacement charging pump tripped on motor overload. The computer notation of alarm point Y3013D is in error. Y3013D is the positive displacement

charging pump auto trip alarm. This alarms when the charging pump trips from overcurrent, undervoltage, or low oil pressure. There was no undervoltage condition and an inspection of the overcurrent relays immediately after the incident showed no relay operation. Therefore, it is concluded that the charging pump tripped on low oil pressure. The oil supply for the charging pump is from an oil pump driven by a chain from the charging pump crackshaft. The low oil trip setpoint is 8 psig. The charging pump is driven by a 4 kv induction motor through a fluid coupling and a speed reducer. The torque transmitted by the fluid coupling is dependent on the charging pump speed setting on controller SK 459 located on the main control board. It could not be confirmed with any degree of certainty the speed setting at the time of the incident. It is known, however, that it was near the low speed stop.

As the primary system pressure increased (after closure of MOV-8701), the charging pump, because of the increased back pressure, began to slow down with the resultant slowdown of the oil pump and decreased oil pressure. At 8 psig oil pressure, the charging pump tripped. Subsequent testing of the charging pump shows the pump trips on low lube oil pressure at a speed corresponding to a flow rate of 8 gpm at some pressure.

The reactor coolant pump first stage seal leakoff recorders show that the maximum leakoff was slightly less than 8 gpm total for the four pumps. Therefore, the net charging rate into the reactor coolant system was less than 1 gpm at the peak reactor coolant system pressure (considering a charging pump trip at 8 gpm). Allowing for observed valve packing leaks, the net charging rate at the peak pressure must have been very close to zero and, therefore, the rate of pressure rise was nearly zero. The wide range seal leakoff flow indicators show the leakoff rising rapidly and then flattening out for a considerable period of time. This further substantiates the premise that the rate of pressure rise at the peak pressure was very close to zero.

The fact that the charging pump tripped and the pressure returned on scale within the same minute indicates that the system was tight or the system pressure was not substantially over 3301 psig. At 1204 the alarm typewriter shows the system pressure at 3141 which is quite a slow pressure decay indicating that the system was tight. This indicates the system pressure was not substantially over 3301 psig.

Based on the charging pump flow at the low lube oil trip point, the wide range RCP leakoff flow indicators and the low pressure decay rate after the charging pump trip, it is concluded that the pressure in the RCS was not substantially over 3301.1 psig as indicated by the computer. Correcting for elevation difference and instrument error, the maximum pressure at the reactor vessel flange during the transient was not substantially over 3326.2 psig.

CORRECTIVE ACTION:

Immediately following the incident a thorough inspection was initiated of all components within the boundary of the system subjected to the overpressure. In addition the Supplier of the equipment (Westinghouse Electric Corporation) was informed of the circumstances and an evaluation of the situation requested.

The inspections performed revealed no damage or signs of stress; preliminary evaluations performed verified that the systems and equipment subjected to the overpressure suffered no degradation. Subsequent to the incident all switchgear rooms have been posted for entry of authorized personnel only. Additionally, guards have been posted and a badge exchange system initiated to preclude entry of unauthorized construction personnel into other sensitive plant areas. It is therefore concluded that no further corrective action is necessary.

1125 Letdown pressure 371.1, letdown temp. 104.6°F, charging flow 91.36 gpm, and seal outlet temp for RCPA & B 101.3°F, 101.8°F respectively (from computer trend typewriter [T/W]).

1129* #1 RCP seal leakoff flow began increasing (from high range seal leakoff recorder).

1134* #3 and 4 RCP seal leakoff began increasing (from low range seal leakoff recorder).

1136* #1 and 2 RCP seal leakoff flow began increasing (from low range seal leakoff recorder).

1140 Letdown temperature began to decrease (from computer trend recorder).

1145 Letdown temperature began to increase (from computer trend recorder).

1154 Letdown pressure goes to -4.2 psig back to 77.8 psig (from computer alarm T/W).

1155 Letdown pressure 40.8 psig, letdown temperature is 103.2°F, charging flow 60.2 gpm, seal outlet temp from RCPA & B 105.3°F and 105.5°F respectively (from computer trend T/W).

1156 Letdown temperature begins several oscillations of varying magnitudes up to 1/2°F over a five minute period (from computer trend recorder).

1156 Letdown pressure goes from -3.9 psig to 32.7 psig (from computer alarm T/W).

1158 Letdown pressure goes to -2.1 psig (from computer alarm T/W).

1159 Pressurizer pressure 3217.7 psig (from computer alarm T/W).

≈ 1200 Operator trips RHR Pump.

1201 Letdown temp begins decreasing (from computer trend recorder).

1201 10 sec. Pressurizer pressure is 3301.1 psig out of range (from computer trend T/W).

≈ 1202 Operator tripped charging pump.

1202 Charging pump indicates tripped (computer alarm T/W).

1202 Charging pump auto trip after start (computer alarm T/W).

1202 Charging pump trip after auto start cleared (computer alarm T/W).

1202 Pressurizer pressure 3301 psig, back in range (computer alarm T/W).

1204 Pressurizer pressure 3141 psig (computer alarm T/W).

* Note the times from these recorders do not agree with the times indicated from other recorders and computer data. The times for the parameters to change do, however, agree with other data.

R Fluegge

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 24, 1975 440

Docket No. 50-304

Karl R. Goller, Assistant Director for Operating Reactors, DRL
THRU: Robert A. Purple, Chief, Operating Reactors Branch #1, DRL

OVERPRESSURIZATION OF THE REACTOR COOLANT SYSTEM AT ZION STATION UNIT 2 (Reference PN-75-93)

At about 1:00 p.m., September 18, 1975, the Reactor Coolant System (RCS) of Zion Unit 2 was overpressurized due to personnel error. The station personnel were in the process of performing a valve interlock test in which the RHR system is automatically isolated from the RCS when sensed pressure reaches a predetermined setpoint. At the time of the test a centrifugal charging pump was running and letdown flow was via the RHR system. When, during the test, the applied test pressure reached the required setpoint, the RHR isolation valves closed, removing the letdown path with the charging pump still attempting to makeup. RCS pressure increased over a period of about eighteen minutes from 95 psig to 1300 psig. The maximum allowable pressure, by Technical Specification, for the indicated temperature (lowest) of 88°F was approximately 450 psig.

I was advised of this occurrence late in the afternoon of Thursday, September 18, 1975, and was advised of the following action:

1. The station was not proceeding with further operation of Unit 2 pending results of an analysis of the incident to be performed by Westinghouse.

2. Region III was investigating the incident and would dispatch inspectors to the site the next day to examine the Westinghouse analysis.

I asked to be advised of the results of the Westinghouse analysis.

At 2:05 p.m., September 19, 1975, I was notified by IE Headquarters, that IE was viewing the incident much more seriously based on some additional temperature data taken which indicated that metal temperature may have been 8-10°F lower than water temperatures. I was informed that IE was considering restricting the Unit from startup because they considered that it had been very close to NDTT during the incident. I was asked if Licensing concurred with this action.

At 2:45 p.m., I identified to IE:HQ what information we would need to come to a decision in the matter.

At 3:25 p.m., I received the requested information from the IE inspector at Zion.

At 3:30 p.m., a meeting was convened which consisted of representatives of TR:Materials Engineering Branch, TR:Reactor Systems Branch and RL: Operating Reactors Branch #1. At that meeting the data provided by OI&E was evaluated and the following conclusions reached:

1. Although there was very little margin remaining there was reasonable assurance that the reactor vessel sustained no damage during the incident.

2. A hydrostatic test to 110% of operating pressure, in accordance with ASME Code Section XI and 10 CFR 50 Appendix G was recommended.

The above recommendations were communicated to IE:HQ at 4:45 p.m., September 19, 1975. I was immediately advised that IE had already suggested a hydrostatic test to the licensee and the licensee had balked. I was asked if we were willing to make the hydrostatic test a "Licensing Order" if necessary.

At 5:30 p.m., it was decided in a telephone conference between RL:OR and TR:MEB that we should not impose the hydrostatic test requirement upon the licensee against its wishes at this point due to the preliminary nature of some of the presumptions of our analysis. At 5:50 p.m., IE:HQ was advised that while we recommended a hydro, we would not issue an order.

As of September 23, 1975, the unit is in the process of returning to power, having achieved power early in the morning, but being tripped due to another unrelated cause. No hydrostatic test was performed, although the station did perform a visual system integrity check at full operating pressure and normal temperature.

The following further NRR action is indicated:

Continue the evaluation of the incident (and a similar incident which occurred in June 1975 in Unit 1) to determine if additional surveillance or testing is indicated for the Zion reactor vessels. (This evaluation to be based on final position to be reached by TR:MEB with respect to Zion reactor vessel properties).

Walter M. Higgins, Project Manager
Operating Reactors Branch #1
Division of Reactor Licensing

cc: See next page

Commonwealth Edison
Zion Generating Station
Shiloh Blvd. & Lake Michigan
Zion, Illinois 60099
Telephone 312/746-2084

June 22, 1973

50-295
Zion-1
6-13-73

U. S. Atomic Energy Commission
Directorate of Licensing
Washington, D. C. 20545

Attention: Mr. J. F. O'Leary, Director

Subject: Reactor Coolant System Overpressurization

Dear Mr. O'Leary:

This letter details an incident reported to Mr. D. Hunnicutt by telephone on June 13, 1973.

At 1737 on June 13, 1973, with the Zion Unit 1 reactor in a cold shutdown condition, the reactor coolant system was pressurized to 1290 psig. Tech Spec Limiting Condition of Operation for system integrity, paragraph 3.3.2.A limits system pressure for the existing temperature of 105°F to 530 psig - reference Figure 3.3.2-2 Reactor Coolant System Cooldown Limitations at a cooldown rate of 0°F/hr.

Safety Implications: System integrity has not been jeopardized by the overpressurization since the reactor vessel temperatures were above the NDT temperatures as listed in Tech Spec Table 3.3.2-1 and the vessel has received no neutron exposure upon which Figure 3.3.2-2 is based.

Investigation and Evaluation: At the time of the incident the reactor coolant system was solid and being maintained at pressures up to 400 psig by intermittant running of a charging pump. The normal pressure control method of continuous charging and letdown was not being used since the volume control tank was unavailable due to repair of the discharge relief valve line on 1C Charging Pump.

At 1730 the 1A Charging Pump, with suction from the refueling water storage tank and discharge aligned to the charging header, was started to increase system pressure which had reduced to 110 psig. System pressure increased gradually. During the maneuver, the Unit 1 nuclear station operator was distracted by a telephone call and left the area of the pump control switch. Pressure increased to 1290 psig before the

5021

pump was tripped, stopping the transient. System pressure was returned to normal after the pressurizer power relief valve was manually opened. An attempt to reduce pressure using the excess letdown path was unsuccessful.

Subsequent Investigation: The investigating committee interviewed Lee Sues, Shift Engineer and Wally Sopata, NSO on Unit 1, concerning the incident. Results of the discussions indicate that:

1. The procedure of pressurizing the system in the described manner had been going on for several days. Both Sues and Sopata were familiar with the method and had accomplished proper pressurization a number of times.

2. The residual heat removal system suction relief valve did not limit overpressure. This valve has a setpoint of 450 psig and a capacity of 900 gpm which is above the capability of the charging pump. If the relief lifted, it should have prevented overpressurization.

3. The RHR system isolated at 600 psig, preventing overpressurization of this system.

4. Pressure could not be reduced using the excess letdown path since the header was isolated manually.

Mechanical and Structural Engineering department, at the request of J. S. Bitel, evaluated the incident to determine if structural damage could have occurred.

Conclusions and Corrective Action: The station committee, after review of M & S Engineerings' report and their own investigation, concluded that no structural damage resulted.

The procedure for pressurization was changed to require the operator to maintain contact with the pump control switch during the pump run. All operators and supervisors were so instructed.

Excess letdown flow was tried after the volume control tank was available and flow and pressure indication were normal.

The RHR system suction relief valve will be removed and tested at the earliest opportunity. This requires isolating both RHR trains with the system in cold shutdown. The discharge relief valves were visually inspected and will prevent RHR overpressure during cooldown.

Very truly yours,

J. S. Bitel

J. S. Bitel
Station Superintendent
Zion Generating Station

JPL/am

Zion Generating Station
Shiloh Blvd. & Lake Michigan
Zion, Illinois 60099
Telephone 312/746-2084

7/31/75

July 24, 1975

Mr. G. Fiorelli, Chief,
Reactor Operations Branch
Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

Zion-1
6-3-75

7-29-75

Dear Mr. Fiorelli:

This letter is in response to your letter of June 25, 1975 requesting additional information in regard to Abnormal Occurrence Report No. 50-295/75-12.

In response to question 1) of that letter, the following items should be noted:

1. The operator failed to stop the centrifugal charging pump when he secured the RHR system to replace the RHR suction relief valve. When the RHR system was secured, letdown was also secured causing the RCS pressure to increase to the 1100 psig maximum pressure.

2. The shift supervisor had reviewed the requirement to stop charging prior to isolating the RHR system, but both he and the operator failed to do so when the RHR system was actually isolated.

3. The RHR system procedures did not include a section on isolating the RHR system while in the cold shutdown condition.

In response to question 2) of the letter regarding corrective action to prevent reoccurrence, a procedure has been written for replacing the RHR suction relief valve while in the cold shutdown condition. For a long term solution, the station is investigating the possibility of installing a relief valve to protect the RCS from overpressurization while the unit is in the cold shutdown condition. A written copy of the overpressurization occurrence and its potential consequences has been distributed to affected operating personnel to stress the importance of preventing an overpressurization of the RCS.

J. S. Bitel

J. S. Bitel
Station Superintendent

8073

79-679 O - 76 - 19

Commonwealth Edison
Zion Generating Station
Shiloh Blvd. & Lake Michigan
Zion, Illinois 60099
Telephone 312/746-2084

6/24/75

June 13, 1975

Mr. James G. Keppler
Regional Director
Directorate of Regulatory Operations
Region III
U.S. Nuclear Regulatory Commission
Glen Ellyn, Illinois 60137

6-18-75

Reference: Zion Generating Station
Docket No. 50-295/DPR-39
Technical Specification, Section 6.6.B.1

Dear Mr. J. Keppler

Enclosed please find Abnormal Occurrence Report No. 50-295/75-12 for Zion Generating Station. This abnormal occurrence was reported to Region III, Directorate of Regulatory Operations by telephone on June 4, 1975 and by telegram on June 4, 1975.

This report is submitted to you in accordance with the requirements of the Technical Specifications, Section 6.6.B.1

Very truly yours,

Jack S. Bitel

Jack S. Bitel
Superintendent
Zion Station

JSB/bjh

Enclosure: Abnormal Occurrence Report No. 50-295/75-12

CONTROL BLOCK | | | | | | | (PLEASE PRINT ALL REQUIRED INFORMATION)

LICENSEE NAME	LICENSE NUMBER	LICENSE TYPE	EVENT TYPE
I L Z I S 1	0 0 - 0 0 0 0 0 - 0 0	4 1 1 1 1	0 1

01 CONT

CATEGORY	REPORT TYPE	REPORT SOURCE	DOCKET NUMBER	EVENT DATE	REPORT DATE
[illegible]	L	L	0 5 0 - 0 2 9 5	0 6 0 3 7 8	0 6 [illegible]

EVENT DESCRIPTION

02 During cold shutdown upon isolating the Unit 1 RHR system to replace its

03 suction relief valve, the 1B centrifugal charging pump was [illegible]

04 and not immediately shut off, causing the RCS pressure to increase

05 from 100 to 1100 psig within ten minutes. The charging pump was shut

06 off and system pressure was reduced to 150 psig within 5 minutes. CONT

SYSTEM CODE	CAUSE CODE	COMPONENT CODE	PRIME COMPONENT SUPPLIER	COMPONENT MANUFACTURER	VIOLATION
C A	A	P U M P X X	N	P 0 2 5	Y

CAUSE DESCRIPTION

08 Operator error was the cause of the RCS pressure transient. The

09 importance of following operating procedures was stressed to the

10 personnel involved.

FACILITY STATUS	% POWER	OTHER STATUS	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION
G	0 0 0	N.A.	A	Operator noticed RCS pressure high.

FORM OF ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY	LOCATION OF RELEASE
Z	Z	N.A.	N.A.

PERSONNEL EXPOSURES

NUMBER	TYPE	DESCRIPTION
0 0 0	Z	N.A.

PERSONNEL INJURIES

NUMBER	DESCRIPTION
0 0 0	N.A.

OFFSITE CONSEQUENCES

N.A.

LOSS OR DAMAGE TO FACILITY

TYPE	DESCRIPTION
Z	N.A.

PUBLICITY

N.A.

ADDITIONAL FACTORS

NAME N. Valos PHONE 312-746-[illegible]

Event Description (continued)

using excess letdown and loop drains. The RCS temperature had been at 140°F for 9 hours prior to ramping down to 105°F over a 45 minute period immediately before isolating the RHR system. The pressure transient occurred at the bottom of this ramp. The incore resistance temperature detector (RTD) temperatures were read immediately and ranged from 125 to 135°F. An engineering evaluation was conducted and it was determined that pressurization of the RCS and reactor vessel can occur at temperatures greater than 115°F at this time in life. Since the exit core thermocouple temperatures were 125-135°F, pressurization of the reactor vessel to 1100 psig did no damage. Visual inspections after the event, and while heating up at pressures of 1000, 1500, and 2235 psig revealed no RCS leakage. The importance of following operating procedures was stressed to the personnel involved. There was one other occurrence of this type #50-295/73-5. (50-295/75-12)

cc: R. A. Purple
D. L. Ziemann
G. Lear
R. W. Reid
T. J. Carter
S. Varga
R. S. Boyd
E. G.Case
B. C. Rusche
R. Heineman
R. Maccary
V. Stello, Jr.
T. Novak
R. Fluegge
S. Pawlicki
W. Hazelton
K. Seyfrit
D. J. Skovholt

Commonwealth Edison
Zion Generating Station
Shiloh Blvd. & Lake Michigan
Zion, Illinois 60099
Telephone 312/746-2084

Regulatory Docket File

September 26, 1975

Mr. James G. Keppler
Regional Director
Directorate of Regulatory Operations
Region III
U. S. Nuclear Regulatory Commission
Glen Ellyn, Illinois 60137

Reference: Zion Generating Station
Docket No. 50-304/DPR-48
Technical Specification, Section 6.6.B.1

Dear Mr. J. Keppler:

Enclosed please find Abnormal Occurrence Report No. 50-304/75-35 for Zion Generating Station. This abnormal occurrence was reported to Region III, Directorate of Regulatory Operations by telephone on 9/18/75 and by telegram on 9/18/75.

This report is submitted to you in accordance with the requirements of the Technical Specifications, Section 6.6.B.1.

Very truly yours,

Jack S. Bitel

Jack S. Bitel
Superintendent
Zion Station

JB/ma

Enclosure: Abnormal Occurrence Report no. 50-304/75-35

10023

CENSEE EVENT REPORT

CONTROL BLOCK | | | | | | | (PLEASE PRINT ALL REQUIRED INFORMA[illegible])

1 6

LICENSEE NAME [illegible] 32 — LICENSE NUMBER 00-00000-00 — LICENSE TYPE 4 1 1 1 1 — EVENT TYPE 0 1

7 8 9 14 15 25 26 30 31 32

01 CONT — CATEGORY — REPORT TYPE L — REPORT SOURCE L — DOCKET NUMBER 0 5 0 - 0 [illegible] 4 — EVENT DATE [illegible] 2 7 8 — REPORT DATE 0 0 2 [illegible]

7 8 57 58 59 60 61 68 69 74 75

EVENT DESCRIPTION

02 At 1255, during a RHR interlock surveillance test (T.S.S.15.6.35) at

03 CSD, 2HCV-RH8701 was closed at a simulated RCS pressure of 600 psig.

04 The closure of this valve isolated the letdown path while charging pump

05 23 continued to operate. This condition caused RCS pressure to increase

06 from its initial value of 92 psig to a (continued)

SYSTEM CODE R C — CAUSE CODE D — COMPONENT CODE [illegible] — PRIME COMPONENT SUPPLIER [illegible] — COMPONENT MANUFACTURER F 0 2 5 — VIOLATION Y

07

7 8 9 10 11 12 17 43 44 47 48

CAUSE DESCRIPTION

08 Procedural deficiency and operator error was the cause of the RCS transi-

09 ent. The procedure lacked sufficient precautions to warn the operator

10 of the potential of this transient and to adequately detail (continued)

FACILITY STATUS G — % POWER 0 0 0 — OTHER STATUS NA — METHOD OF DISCOVERY A — DISCOVERY DESCRIPTION Test Engr. noticed RCS pressure increase

11

7 8 9 10 12 13 44 45 46

FORM OF ACTIVITY RELEASED Z — CONTENT OF RELEASE Z — AMOUNT OF ACTIVITY NA — LOCATION OF RELEASE NA

12

7 8 9 10 11 44 45

PERSONNEL EXPOSURES

NUMBER 0 0 0 — TYPE Z — DESCRIPTION NA

13

7 8 9 11 12 13

PERSONNEL INJURIES

NUMBER 0 0 0 — DESCRIPTION NA

14

7 8 9 11 12

OFFSITE CONSEQUENCES

15 NA

7 8 9

LOSS OR DAMAGE TO FACILITY

TYPE Z — DESCRIPTION NA

16

7 8 9 10

PUBLICITY

17 NA

7 8 9

ADDITIONAL FACTORS

18 NA

7 8 9

19

7 8 9

NAME [illegible] PHONE [illegible]

Event Description cont.

peak pressure of 1300 psig in a fifteen (15) minute time interval. Near the peak pressure charging pump 22 was secured and excess letdown was established to reduce RCS pressure. RCS pressure was returned to its initial value in approximately twenty (20) minutes.

The RCS temperature was at approximately 80°F for (10) ten hours prior to and during the transient. A fracture mechanics and fatigue analysis had been made of this transient by the NSSS vendor Westinghouse Electric Corporation. The nozzle and core beltline areas (most limiting) were considered assuming a peak transient pressure of 1300 psig and a RCS temperature of 80°F. With the assumption that large flaws previously existed in these regions, the analysis shows that unstable crack growth would not have occurred and that fatigue crack growth would have been negligible. In addition, the subject transient was of no consequence relative to the integrity of the RCS piping and other loop components. These same conclusions were reached during an additional analysis performed at 1360 psig, and 70°F. There were two other occurrences of this type: no. 50-295/73-5 and no. 50-295/75-12.

The procedure (T.S.S. no. 15.6.36) used to check RHR-RCS interlocks has been rewritten such to prevent reoccurrence of this transient. The revised procedure was used in a successful test on September 18, 1975. In addition a modification is being prepared to provide overpressure protection for the RCS during CSD. A hydrostatic test of the RCS was considered but this action was not taken since it would not provide any additional information over a visual inspection at normal operating temperature and pressure. The containment (including RCS piping, vessel and loop components) were visually inspected at HSD on September 22, 1975 with no abnormalities observed. (50-304/75-35)

Cause Description cont.

charging system operation. It is also felt the operators response to the overpressure transient could have been more timely to reduce the peak pressure achieved during this transient. The normal relief protection was isolated when 2MOV-RH8701 was closed for testing.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

Dyer

September 19, 1975

H. D. Thornburg, Chief, Field Coordination and Enforcement Branch
Office of Inspection and Enforcement, Headquarters

COMMONWEALTH EDISON COMPANY (ZION UNIT 2)
DOCKET NO. 50-304
PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE
OVERPRESSURIZATION OF REACTOR COOLANT SYSTEM

The attached communication covering the preliminary information regarding the overpressurization of the reactor coolant system at Zion Unit 2 is forwarded with the recommendation it be issued as a "Preliminary Notification."

G. Fiorelli
G. Fiorelli, Chief
Reactor Operations Branch

Attachment:
As stated

cc w/attachment:
J. G. Davis, DD
R. F. Warnick, Regional Coordinator
B. H. Grier, IE:HQ

PRELIMINARY NOTIFICATION - NOT FOR PUBLIC DISCLOSURE

No: PN-III-75-42
Date: September 19,

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE

This preliminary notification constitutes EARLY notice of events of POSSIBLE safety or public interest significance. The information presented is as initially received without verification or evaluation and is basically all that is known at the time of this notification. IT SHOULD BE SPECIFICALLY NOTED THAT THIS NOTIFICATION MAY CONTAIN INFORMATION THAT LATER MAY BE DETERMINED TO BE INACCURATE OR INCONSISTENT.

Facility: Commonwealth Edison Company (Zion Unit 2)

Subject: OVERPRESSURIZATION OF REACTOR COOLANT SYSTEM

At 1255 hours on September 18, 1975, the reactor coolant system was inadvertently pressurized from 90 psig to approximately 1300 psig over a 5 minute period. The reactor was in cold shutdown at the time. Incore thermo couples indicated coolant temperature to be 110°F. The Licensee was performing a 20 month surveillance test on the Residual Heat Removal System (RHR) valve interlock. During the test the RHR valve closed as designed isolating the RHR letdown system from the Chemical Volume Control System with the charging pump still operating. The Licensee has committed to remain in cold shutdown until the consequences of the incident are evaluated to determined if the vessel NDTT was approached.

This is the second overpressurization event at the Zion facility in 3 months.

An inspector has been dispatched to the site.

Region III received notification of this occurrence by telephone from Commonwealth Edison at 1508 hours, September 18, 1975.

Contact: T. N. Tambling, R. C. Knop, G. Fiorelli
Prepared by — Senior — Branch

September 19, 1975

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE —PN-75-93

Facility: Commonwealth Edison Company (Zion Unit 2)

Subject: OVER PRESSURIZATION OF REACTOR COOLANT SYSTEM

At 1255 hours on September 18, 1975, the reactor coolant system was inadvertently pressurized from 90 psig to approximately [illegible] psig over a 5 minute period. The reactor was in cold shutdown at the time. Incore thermocouples indicated coolant temperature to be 110°F. The licensee was performing a 20 month surveillance test on the Residual Heat Removal System (RHR) valve interlock. During the test the RHR valve closed as designed isolating the RHR letdown system from the Chemical Volume Control System with the charging pump still operating. The licensee has committed to remain in cold shutdown until the consequences of the incident are evaluated to determine if the vessel NDTT was approached.

This is the second overpressurization event at the Zion facility in 3 months. On June 4 the Unit 1 vessel pressure increased to 1200 psig. The licensee's evaluation of that event concluded that system integrity had not been compromised.

An inspector has been dispatched to the site to determine the cause of the event and to review the licensee's analysis of the event and their corrective actions to prevent recurrence.

Region III received notification of this occurrence by telephone from Commonwealth Edison at 1503 hours, September 18, 1975.

9/19

Contact: RFWarnick, IE x7261 HDThornburg,, IE x7553 JGDavis, IE x7541

Distribution:

Chairman Anders	Commissioner Mason	S. J. Chilk, SECY
Commissioner Gilinsky	Commissioner Rowden	G. F. Murphy, JCAE
Commissioner Kennedy	C. C. Kammerer, CA	
L. V. Gossick, EDO	D. F. Knuth, IE	J. A. Harris, PA
B. C. Rusche, NRR	R. H. Brown, ISP	T. J. McTiernan, AIA
K. R. Chapman, NMSS	H. K. Shapar, ELD	

Transmitted: P Bldg _____; H St _____; MNBB _____; Luge _____

WISCONSIN PUBLIC SERVICE CORPORA...

P.O. Box 1200, Green Bay, Wisconsin 54305

September 2, 1976

Division of Operating Reactors
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

ATTN: Mr. A. Schwencer, Chief
Operating Reactors Branch #1

Gentlemen:

REF: Docket Number 50-305
Operating License DPR-43

Wisconsin Public Service Corporation was requested by your letter dated August 11, 1976, to evaluate system designs at the Kewaunee Plant to determine the susceptibility to overpressurization events and to notify you within 20 days that we will provide all the information requested within 60 days or explain why we cannot meet this schedule and provide the schedule that will be met.

This letter is to notify you that a task group of utilities with Westinghouse plants has been formed, of which Wisconsin Public Service Corporation is a participant, to examine the complexity of the overpressurization events and to identify similarities between Westinghouse plants for the purpose of determining a consistent solution to this issue. The task group will meet with Westinghouse for the purposes of establishing plant groupings and to evaluate the means by which the likelihood of additional occurrences of reactor vessel overpressurization events can be minimized.

Each utility will examine their plant's operating procedures and administrative controls during the 60 day period referenced in your August 11, 1976, letter. The purpose of this examination will be to evaluate procedural changes that will minimize the likelihood of overpressurization events. As an interim measure, the plant operating personnel will be informed of the potential for overpressurization and will be cautioned to minimize conditions which could cause such an event should reduced pressure and temperature operation occur before the detailed review is completed.

The results of the task group meeting will be reported to the NRC by each utility at the end of the 60-day period. Recommendations and schedules will be given at that time as well as the results of the plant procedure review and resulting procedure revisions, if appropriate.

Should you have any questions concerning this program or the preliminary schedule described herein, please contact us.

Very truly yours,

E. W. James
Senior Vice President
Power Supply & Engineering

EWJ:sna

BALTIMORE GAS AND ELECTRIC COMPANY

GAS AND ELECTRIC BUILDING

BALTIMORE, MARYLAND 21203

ARTHUR . LUNDVALL, JR.
VICE PRESIDENT
SUPPLY

50-317

50-318

October 11, 1976

RECEIVED
OCT 18 1976
U.S. NUCLEAR REGULATORY COMMISSION
Mail Section

Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention:

Mr. D. L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors

Mr. Karl Kniel, Chief
Light Water Reactors Branch #2
Division of Project Management

Subject: Calvert Cliffs Nuclear Power Plant
Units No. 1 and 2
Reactor Coolant System Overpressurization
File: L-037-R

References: (1) NRC letter to BG&E, Ziemann to Lundvall, dated August 13, 1976, subject: Calvert Cliffs Unit No. 1

(2) NRC letter to BG&E, Kniel to Gore, dated August 25, 1976, subject: Calvert Cliffs Unit No. 2

(3) BG&E letter to NRC, Olson to Kniel and Ziemann, dated August 27, 1976 subject: Calvert Cliffs Units No. 1 and 2

Gentlemen:

Reference (1) transmitted NRC concerns regarding possible reactor vessel overpressurization at Calvert Cliffs Unit No. 1 when in the cold, water-solid operating condition and requested that we notify you within 20 days that we would address those concerns within 60 days. Reference (2) expanded the scope of those concerns to include Calvert Cliffs Unit No. 2. Reference (3) transmitted our initial response to your letters and stated that we would require 90 days rather than 60 days to fully address your concerns. However, your staff subsequently expressed a concern that we did not intend to take any interim action for those 90 days. We then notified your staff by telephone that we had already implemented interim procedural changes to reduce the likelihood of an overpressure transient.

10444

The intent of this letter is to confirm that telephone conversation and to inform you of the short-term measures that have been instituted to minimize the unlikely event of a reactor vessel overpressurization incident when in the cold, water-solid operating condition. These short-term measures are as follows:

1. The addition of a general precaution to the operating procedure entitled, "Plant Shutdown from Hot Standby to Cold Shutdown" to instruct operating personnel to minimize the time in which the primary system is in a water-solid condition.

2. The updating of the above mentioned procedure to ensure that during cold, solid-water operations:

   a. pressurizer heaters are disabled
   b. high pressure safety injection pumps are disabled, and
   c. high pressure safety injection header stop valves are shut when the Reactor Coolant System is being operated in the water-solid condition.

3. An additional change to the above procedure requiring the reduction of steam generator temperature to 220F by dumping steam prior to placing the shutdown Cooling System in operation. The required temperature had been 270F, and this further reduction will preclude the possibility of an overpressure incident occurring upon the startup of an idle reactor coolant pump with a hot steam generator.

4. A computer-generated variable setpoint high pressure alarm will be utilized when the computer is operable. This alarm point will be set below the maximum allowable pressure for existing reactor coolant temperatures to warn the operator of a pressure excursion.

These procedures are available for inspection at the Calvert Cliffs site.

In addition to the above-mentioned short-term measures that have been taken, we are in the process of developing our long-term measures. To this end, we are a participant in an owners' group with Combustion Engineering. The purpose of this group is to develop the generic analysis of the cold, water-solid overpressurization incident. Upon completion of this analysis, our long-term solution will be formulated. This long-term solution, and the schedule of implementation of that solution, will be provided to you by January 1, 1977.

Sincerely,

A. E. Lundvall, Jr.

cc: Messrs. N. Hood - NRC
E. Reeves - NRC
J. A. Biddison, Esq.
G. F. Trowbridge, Esq.

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

November 1, 1976

The Honorable
Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Marc:

Thank you for your response to my letter of October 22 in which I expressed concern about reactor vessel over-pressurization. I look forward to receiving additional information as it is compiled, particularly in regard to materials requested in Items 3, 4 and 5 of my October 22 letter.

Sincerely,

Mo

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

XV. State Role in Nuclear Regulation

79-679 O - 76 - 20

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

October 20, 1976

COPY

The Honorable
Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Marc:

As you know, along with 29 co-sponsors, I have introduced a bill to amend the Atomic Energy Act for the purpose of providing for the possibility of greater participation by states in the nuclear regulatory process. It is therefore with interest that I learned from the October 19 issue of The Energy Daily that the NRC is undertaking a major study of the relationship between federal and state levels of government in matters pertaining to nuclear regulation. I would hope that the NRC study would include a comprehensive analysis of the probable consequences of H.R. 15788 or H.R. 15789 should either of these (or approximations thereto) be enacted.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

XVI. Public Document Room

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

November 3, 1976

The Honorable
Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Marc:

I have received reports indicating that, since establishment of the NRC, there have been substantial improvements in the workings of the H Street Public Document Room. This is a strong indication of a commitment to encouragement of widespread participation in the regulatory process.

I hope that those responsible for these improvements might be informed that their efforts are important and appreciated, and that their initiatives to provide appropriate improvements be encouraged.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

XVII. Plutonium Recycle Decision Making Procedures

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

October 15, 1976

COPY

The Honorable
Marcus A. Rowden, Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Rowden:

For purposes of clarifying and expanding upon the discussion at the Subcommittee's hearings held on September 20, 21 and 28, I would appreciate your providing answers to the questions listed on the attached pages. These questions were based, in part, on the response we received to Mr. Tsongas' suggestion, made during the hearings, that witnesses submit questions to be addressed to others who had presented testimony.

In order that the record be published at an early date, I hope that we would receive these answers no later than November 23, 1976.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy
and the Environment

Request to the Nuclear Regulatory Commission for Information to be Inserted in the Record of GESMO Procedures Hearings before the House Interior Committee Subcommittee on Energy and the Environment, September 20, 21, and 28

1. To what extent would an NRC decision to allow use of plutonium in light water reactors rest on the assumption that LMFBRs will become commercially viable in the 1990's?

2. To what extent does the NRC consider that the GESMO and associated procedures now in progress also encompass the fuel cycle aspects of the LMFBR? For example, if a positive decision is made by the NRC with regard to plutonium recycle, and the LMFBR eventually is determined to be safe and economically viable, to what extent will NEPA require a de novo analysis of the health, safety, environmental and safeguards aspects of the plutonium fuel cycle?

3. Please describe the NRC procedure for preparation and review of the Final GESMO.

4. What was the procedure used to delineate the plutonium recycle alternatives to be analyzed in the GESMO? For example, what was the basis for not considering the following alternatives: a fuel cycle based on the use of thorium; the "tandem fuel cycle" suggested by the Arms Control and Disarmament Agency; non-fission alternatives to plutonium recycle; and matching of fuel reprocessing plans to the schedule for introduction of the LMFBR? To what extent will matters not considered in the Final GESMO (e.g. inter-

national implications of the recycle decision, the "tandem fuel cycle", and non-fission alternatives to plutonium recycle) be analyzed in GESMO supplements?

5. Please describe the process for analyzing comments on the Draft GESMO and for reaching a decision concerning the extent to which recommendations contained in such comments should be incorporated in the Final GESMO.

6. In what ways does the Final GESMO reflect comments made in regard to the Draft GESMO? (Please indicate the character and source of any comments which resulted in major changes in the Draft GESMO.)

7. To what extent did other agencies participate in review of the Final GESMO prior to its having been printed for public release? (Please provide documents containing agency comments or recommendations for change.)

8. In what manner and fashion are ERDA and the Arms Control and Disarmament Agency participating in ongoing plutonium recycle proceedings? What steps are being taken to insure that perspectives of these agencies are taken account at an early stage of the proceedings?

9. Does the NRC consider that the plutonium recycle proceedings are the proper forum for addressing the fundamental question of whether it is in the national interest to start on a course that will eventually lead to a major portion of the nation's electric generating capacity being dependent upon plutonium as an energy source?

10. If the answer to the preceding question is negative, in what forum and at what time does the NRC believe the fundamental plutonium decision (as defined above in the preceding question) should be addressed?

11. How will the NRC address the question of whether blending should be considered as a condition for approval of plutonium recycle?

12. To what extent will the existence of the reprocessing plant at Barnwell, South Carolina influence the Commission's recycle decision?

13. What procedures exist to insure that the plutonium recycle cost-benefit analysis is put in a context that shows costs and benefits from the perspective of the consumer as well as from the perspective of the industry?

14. To what extent do the findings presented in the Final GESMO represent the views (or have the endorsement) of the Commission, as opposed to representing the views of the NRC staff?

15. What process did the Commission institute in releasing the Final GESMO? What matters did the Commission consider in authorizing such release? Did the Commission vote on such matters? Please indicate the outcome of any such votes.

16. If the Commission decides against the funding of public participants in the GESMO proceedings, what assurance is there that the record resulting from these proceedings will be comprehensive and complete, and thereby provide an adequate basis for a sound and credible decision?

17. Given that the GESMO hearings are already underway and proceeding rapidly on a tight schedule, how can currently underfunded participants plan effectively for their participation if they will not know for several weeks whether NRC financial assistance will be available? If funding is made available, will the NRC support a lull in the hearings so that the benefits of timely financial assistance can be available for the critical stages of the hearings now scheduled for later this year?

18. The NRDC and others have strongly objected to the early deadlines and inadequate time allowed by the GESMO Hearing Board in its September 17 order. Would the NRC be willing to entertain and decide a motion by the parties seeking a revision of the Hearing Board schedule?

19. Given the importance of cross-examination to getting to the bottom of critical issues in GESMO, is it the NRC's intent to resolve cases of doubt in favor of holding adjudicatory hearings at the conclusion of the present legislative-type hearings?

Response to October 15, 1976 letter
not received as of date of printing.

1976 SUBCOMMITTEE CORRESPONDENCE WITH
THE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

XVIII. Breeder Reactor Development

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

April 27, 1976

Dr. Robert C. Seamans, Jr.
Administrator
Energy Research and Development
Administration
20 Massachusetts Ave.
Washington, D.C. 20545

Dear Dr. Seamans:

As a reluctant supporter of breeder reactor research and development, I am not convinced that the ERDA program is optimal either with regard to timing or to priorities. I have particular reservations concerning the Clinch River Breeder Reactor (CRBR). Before Congress votes additional funds for this project, I believe ERDA should provide a more comprehensive explanation of the role of the CRBR in the overall breeder development program. There should be additional explanation of why the completion of the CRBR design cannot be delayed until operational data is obtained from the Fast Flux Test Facility and from the various facilities engaged in testing sodium pumps and heat exchangers. ERDA should also provide an expanded discussion of why funds destined for Clinch River would not be better used in further development of the HTGR and other types of converter reactors and in developing alternative breeder concepts.

I am aware of the assertions put forth in defense of constructing the CRBR in accordance with the schedule proposed by ERDA. However, each assertion raises a set of questions which I believe need be answered prior to authorization of additional funds. Assertions and associated questions are as follows:

1. <u>Uranium resources and the likely rate of electric power demand growth are such that the breeder program and its major elements such as Clinch River cannot be delayed further.</u>

--What rates of growth of electric power demand are now assumed by ERDA?

--How do these rates of growth compare with the FEA's current projections and the various projections of the Ford Foundation Energy Policy Project?

--Have ERDA's electric power demand projections changed since issuance of the LMFBR Program Environmental Impact Statement and since ERDA's recent emphasis on conservation?

--Under the most recent electric power demand projections, what are the estimated cumulative amounts of uranium ore extracted through the years 1990, 1995, 2000, 2005 and 2010?

--How much would the need for a commercial breeder be delayed as the consequence of a major effort to improve the efficiency of converter reactors and to encourage the use of more efficient reactors by utilities?

--How much would the need for a commercial breeder be delayed as the result of a decision to recycle plutonium produced in converter reactors?

2. <u>It is necessary to procede immediately with the CRBR in order to maintain a schedule such that a commercialization decision can be made in the mid-1990's.</u>

--What would be the consequence of a determination in the late 1980's that the liquid metal fast breeder concept is not suitable for commercialization?

--Does not the fact that the LMFBR concept is being developed to the near exclusion of other concepts (e.g. gas-cooled fast breeder, light water breeder, molten salt breeder, heavy water breeder, etc.) mean that the nation will be in the breederless situation that ERDA fears if the LMFBR is determined in the late 1980's to be commercially not viable?

--Does not the nearly complete focus on the LMFBR mean a de facto commitment to this technology?

3. It is necessary to procede immediately with the CRBR in order to obtain experience with an LMFBR intermediate in size between the FFTF reactor and the Near Commercial Breeder Reactor (NCBR).

--What precisely is it that will be learned from the CRBR that could not be learned from the FFTF and sodium test facilities?

--Do you agree with the Joint Committee on Atomic Energy Ad Hoc Subcommittee to Review the Liquid Metal Fast Breeder Reactor Program statement in its report (page 74) that even a redesigned CRBR would be "...obsolete with respect to the then-current technology...," and, if so, how relevant will be the CRBR operating experience to future commercial breeders?

--What information will the CRBR provide that can assist in determining the economic viability of commerical LMFBRs?

4. It is important to procede with the CRBR in accordance with the ERDA schedule in order to maintain the cohesiveness and skills of design and construction teams.

--Why cannot teams be assigned to design of other reactor projects (e.g. a 1000 MW CRBR, more efficient converter reactors, etc.) while data is being obtained from the FFTF and sodium test facilities?

--What are the skills that would be lost and where would they go were the CRBR to be delayed?

--How many engineers and technicians are currently involved in the design teams?

--Who currently employs the design teams?

--What are the projects in addition to the CRBR which ERDA envisions assigning to these design teams?

--Over what period does ERDA believe these design teams should remain intact?

--What experience is there with major projects to indicate that it is important to maintain the existence of design teams over such extended periods?

Dr. Robert C. Seamans, Jr. April 27, 1976

--Is there not a danger that long lasting design teams will grow stale, will resist new solutions, and will not admit past mistakes?

--If maintenance of design teams is important, should not something be done to keep together the General Atomics HTGR design group which could be valuable in an effort to make a more definitive assessment of the HTGR technology?

--How does ERDA envision the transfer of design teams' expertise to the industry that will produce commercial breeders?

5. <u>The CRBR will produce important experience with a breeder which produces electric power that is fed into a utility grid.</u>

--What is the nature of this experience and why is it important?

--How is this experience relevant since it is admitted that the CRBR will bear little resemblance to the commercial LMFBR?

In addition to providing answers to the foregoing questions, please provide a tabulation of Federal expenditures to date and future Federal expenditures by year on the Fast Flux Test Facility, the Sodium Pump Test Facility, the Sodium Component Test Installation and the two proposed Large Prototype Breeder Reactors.

Since the information being requested herein was presumably needed to make the decision to procede with the CRBR, I am sure that it is readily available. In order that Congress be properly informed concerning the breeder reactor development program prior to voting on the ERDA FY 1977 authorization, I am requesting that this information be provided me prior to May 4.

Thank you for your cooperation in this matter.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

79-679 O - 76 - 21

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

MAY 5 1976

Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and Insular Affairs
House of Representatives

Dear Mr. Chairman:

Enclosed is the response to your letter of April 27, 1976. I hope this clarifies our position on the issues you raised.

Please let me know if you desire expansion on these or other items concerning ERDA programs. I will be happy to provide any informati you desire.

Sincerely,

Robert C. Seamans, Jr.
Administrator

Enclosure:
Information Memorandum,
R. W. Roberts to Robert C. Seamans

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

MAY 4 1976

INFORMATION MEMORANDUM

TO: Robert C. Seamans, Jr., Administrator

Signed by Richard W. Roberts

FROM: Richard W. Roberts, Assistant Administrator for Nuclear Energy

SUBJECT: RESPONSE TO M. K. UDALL'S LETTER OF APRIL 27, 1976, REQUESTING INFORMATION ON THE LMFBR PROGRAM

Purpose

This reply provides a discussion of the issues presented in Chairman Udall's letter of April 27, 1976, concerning the LMFBR program timing and priorities. Specific emphasis is directed toward the need for completion and operation of the Clinch River Breeder Reactor Plant (CRBRP) as an integral part in the development and demonstration of the LMFBR program.

Discussion

The CRBRP is a vital element in the path to commercialization. It provides the key transition step from the technology development stage to large scale demonstration. With a gross electrical capacity of 380 MW and with design features applicable for scaleup to large size plants, CRBRP will serve to provide essential design, construction, and operating experience leading to the next step, the prototype large LMFBR plant. Characteristics such as licensability , operability, availability, reliability and maintainability must be confirmed before the breeder can become a viable option for the production of electric power.

The timing of the CRBRP is directly related to the ERDA decision on commercialization of the LMFBR presently scheduled for 1986. In the December 31, 1975, Administrator's Findings on the Liquid Metal Fast Breeder Reactor Program Final Environmental Statement, Dr. Seamans stated as the basis for his selection of the "reference plan" from the eight alternatives presented, "This plan contemplates construction and operation of the CRBR, a Prototype Large Breeder Reactor (PLBR), and a Commercial Breeder Reactor (CBR-1) on a schedule which calls for operation

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

of a Nuclear Regulatory Commission -- licensed CRBR for three years and completion of the design, procurement, component fabrication and testing phase for, and issuance by the Nuclear Regulatory Commission of a construction permit for, the PLBR prior to a commitment to construct the CBR-1. In my judgment, this schedule should provide sufficient experience in design, procurement, component fabrication and testing, licensing and plant construction and operation from CRBR and PLBR taken together to enable ERDA to predict with confidence the successful construction and operation of the CBR-1."

It is felt that the cost in delaying the LMFBR commercialization decision which would result from delaying completion of the CRBRP design until operational data from the Fast Flux Test Facility (FFTF) is obtained would outweigh potential benefits. We have estimated that delaying the introduction date for the LMFBR reduces the benefits by 1 to 3 billion dollars for each year of delay with the exact value depending upon the uranium supply and the energy demand.

The CRBRP design team has drawn heavily upon the design experience of the FFTF. However, it was recognized that the FFTF was designed for a different purpose and will be operated on a different basis than CRBRP, because it is a fuels and materials irradiation test facility rather than a power production reactor with associated turbine generators.

We believe that a preinstallation test program is necessary before new major component designs are used in reactor systems. However, a schedule delay would not be necessary as the present CRBRP schedule includes testing of Prototype CRBRP sodium pumps and heat exchangers at the Liquid Metal Engineering Center (LMEC) prior to their installation and operation in the reactor. Modification of the Sodium Components Test Installation (SCTI) and Sodium Pump Test Facility (SPTF) is currently underway or planned at LMEC to meet the higher CRBRP test load requirements.

The question of why funds destined for Clinch River would not be better used in further development of the High Temperature Gas Reactor (HTGR) and other types of converter reactors and in developing alternative breeder concepts is one of differing national energy priorities. Thus, CRBRP is supported as an integral part of the high priority LMFBR program as a "inexhaustible" energy source for the long-term along with solar electric and fusion systems which are at an earlier stage of development. The HTGR and other types of reactors are supported at lower funding levels because they do not offer the potential benefits of the breeder. The ERDA approach is to concentrate funds where they can show there is a benefit.

Other breeder reactor concepts are not sufficiently developed at this time to be considered alternates to the LMFBR for early commercialization. Long-range energy projections and uncertainties in uranium resource supplies demonstrate a clear need for early introduction of a safe, reliable and commercially competitive breeder reactor system to maintain a viable long-range nuclear energy option. The Administrator has defined certain conditions which must be met before a decision can be made that is ready for commercialization. They include the demonstration of satisfactory plant operation, fuel cycle performance, reactor safety, safeguards, health effects, waste management and uranium resource availability. Of these, safeguards, health effects, waste management and uranium resource availability are not unique to the LMFBR but must be met by the overall nuclear sector.

Other reactor concepts in addition to the HTGR are being evaluated including Gas Cooled Breeder Reactors (GCBR) and Light Water Breeder Reactors (LWBR). The potential of the thorium fuel cycle to extend uranium resources is also being assessed. The interrelationships between converter and breeder fuel cycles are being studied to optimize overall fuel utilization efficiencies. These studies and future periodic position reassessments will provide a continuing basis for the ERDA nuclear option development programs.

Copies of Volume 1 of "A National Plan for Energy Research, Development and Demonstration: Creating Energy Choices for the Future - 1976" (ERDA 76-1) and Volume 1 of the "Final Environmental Statement, Liquid Metal Fast Breeder Reactor Program" (ERDA 1535) are enclosed for your ready reference. The details of the LMFBR positions as an option in the overall ERDA Energy Development Plan are contained in ERDA 76-1. A detailed discussion of the cost-benefit impact of LMFBR scheduling is included in ERDA 1535.

Responses to the statements and questions itemized in Chairman Udall's letter are provided in Enclosure 3 to this memo.

The tabulation of Federal expenditures to date and future Federal expenditures by year on the Fast Flux Test Facility, the Sodium Pump Test Facility, the Sodium Component Test Installation, the Clinch River Breeder plant and the Prototype Large Breeder Reactor which were requested are enclosed as Enclosure 4.

Enclosures:
1. Volume 1 of ERDA 76-1
2. Volume 1 of ERDA 1535
3. Assertions and Questions
4. Projected Federal Expenditures for FFTF, SPTF, SCTI, CRBR and PLBR

ASSERTIONS AND QUESTIONS

1. Uranium resources and the likely rate of electric power demand growth are such that the breeder program and its major elements such as Clinch River cannot be delayed further.

For the past four years, despite greatly increased drilling, industrial exploration has produced new reserves which barely offset production in those years. Unless increased industrial exploration results in a much larger discovery rate, the industry may be unable to achieve and sustain the production rates required for projected uranium demand in 1985 and beyond. The uncertainties in uranium supply, coupled with equally large uncertainties in the current electric power demand growth projections are the bases for the conclusion that prudence dictates preparation for the early commercialization of the breeder.

-- What rates of growth of electric power demand are now assumed by ERDA?

ERDA's objective is not based on meeting specific projected energy requirements but is directed to the establishment of a multiplicity of energy options with sufficient flexibility to meet a wide variety of potential near-term to long-range national energy requirements.

Where required for analyzing inputs and cost benefits for an energy option, projected power growth ranges are used rather than line projections. These ranges are made broad enough to cover current projections by FEA and others and are periodically updated.

To illustrate, the six scenarios in the first ERDA national plan "Creating Energy Choices for the Future" (ERDA 48) were based on four growth cases for electrical energy growth. They are:

Electricity Growth (trillion kwhrs)

	1973	1980	1985	1990	2000
High	1.88	2.78	3.90	5.29	9.88
Moderate/High	1.88	2.68	3.66	4.82	8.60
Moderate/Low	1.88	2.63	3.57	4.66	7.92
Low	1.88	2.57	3.50	4.40	7.02

The moderate-low rate has been considered to be the most likely for high conservation scenario cases.

-- How do these rates of growth compare with the FEA's current projections and the various projections of the Ford Foundation Energy Policy Project?

The "Low" projections in the preceding table tracks the FEA projectives very well through 1985 reflecting a reduction in expected growth rate from 6% to 5.8% per year for this time period.

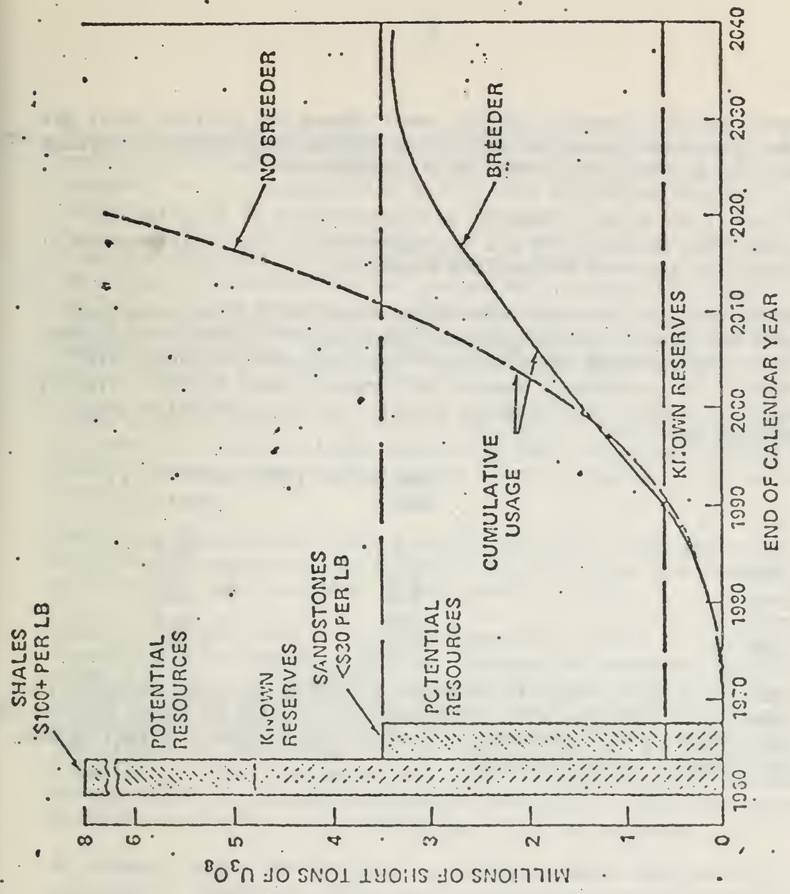
The scatter in projections increases beyond 1985. The Ford Foundation's projections to the year 2000 for their zero growth and historical cases range from 3.40 to 7.96 trillion kwhrs with FEA's projection rising to 5.54 kwhrs. These compare with ERDA's range of 7.02 to 9.88 kwhrs in the year 2000.

-- Have ERDA's electric power demand projections changed since issuance of the LMFBR Program Environmental Impact Statement and since ERDA's recent emphasis on conservation?

The ERDA electric power demand planning projections have not changed from those used in the LMFBR Program Final Environmental Statement.

We work closely with the FEA in defining the electric power demand ranges used for program guidance and will continue to do so.

We are watching carefully current load factors during the recovery of the economy in order to make prompt use of current information. Present trends would indicate electric power growth requirements in the 6% per year range.



EFFECT OF BREEDER INTRODUCTION ON URANIUM USAGE

-- Under the most recent electric power demand projections, what are the estimated cumulative amounts of uranium ore extracted through the years 1990, 1995, 2000, 2005 and 2010?

Figure 1 shows the estimated cumulative usage of U_3O_8 for the years 1970 through 2020 for the moderate-low electrical demand case both with and without the breeder.

It should be noted that this figure shows cumulative usage and does not show additional uranium commitments required to continue operating existing LWR plants for the remainder of their lifetimes. The commitment numbers are several times higher. Typical cumulative commitment numbers compared to the cumulative usage numbers are:

	Cumulative (Million ST U_3O_8) Usage	Commitment
1990	.6	2.1
1995	1.1	3.3
2000	1.8	4.4
2005	2.6	5.0
2010	3.5	6.3

Thus, it would be easy to overcommit uranium reserves early in the construction program with a consequent reduction in plant life or the generation of the additionally needed annual converter fuel reloads in a breeder reactor complex.

-- How much would the need for a commercial breeder be delayed as the consequence of a major effort to improve the efficiency of converter reactors and to encourage the use of more efficient reactors by utilities?

A substantial gain in fuel utilization efficiency will result from establishing a capability for uranium and possibly plutonium recycle in LWR's. These options are contingent on establishing a commercial spent fuel reprocessing capability. Here ERDA is directly involved and with our support it is expected that the Barnwell plant will be operational in the early 1980's.

While uranium recycle will reduce LWR reload uranium requirements by about 20%, this will not change the ERDA projected uranium usage numbers because they already assume uranium recycle as the base case.

Neutronic improvements could possibly help fuel utilization efficiencies somewhat. It is difficult to see how the conversion ratio of 0.5 - 0.6 could be significantly changed.

Much has already been done in the commercial sector to improve the operating efficiencies of LWR's. Emphasis has been on improving plant factors. Joint studies are underway with EPRI to define potential areas where ERDA involvement would be appropriate and productive. However, while an improved plant factor would increase the electrical generation rate of a fixed installed nuclear plant capacity, it should be noted that fuel utilization would increase in proportion to the increased power production. This increased uranium usage would weigh against delaying the breeder.

In summary, while improvements in converter plant design and operation efficiencies could have a significant impact on plant economics, they would have only marginal impact on fuel utilization rates and efficiencies.

-- How much would the need for a commercial breeder be delayed as the result of a decision to recycle plutonium produced in converter reactors?

Recycling self-generated plutonium in converter reactors could result in a further reduction of about 20% of uranium requirements for plant reloads. However, obtaining the necessary licensing and regulatory approvals, along with the necessity of establishing commercial mixed oxide fuel reprocessing and refabrication facilities, could delay significant Pu recycle in LWR's until the mid-1980's. Then the breeder market for Pu would open around 1990 which would restrict widespread LWR Pu recycle to about five years. This would extend uranium reserves less than one year at the 1985-1990 reload consumption rate.

Studies are being initiated in ERDA to evaluate more fully the effect of Pu recycle in LWR's on overall fuel energy conversion efficiencies in a nuclear sector with LMFBR penetration in the early 1990's. Early savings in LWR reload uranium requirements may be more than counterbalanced by an earlier onset of a Pu restricted LMFBR construction rate. The alternative to LWR Pu recycle would be to stockpile the Pu for LMFBR initial loadings where it is more efficiently utilized in energy production.

2. <u>It is necessary to proceed immediately with the CRBR in order to maintain a schedule such that a commercialization decision can be made in the mid-1990's</u>.

Assertion No. 2 is incorrect in that the ERDA schedule for the LMFBR commercialization decision is presently 1986 rather than in the mid-1990's.

The ERDA position on the need for the CRBR experience before making the commercialization decision is best expressed by the Administrator in his Findings on the LMFBR Final Environmental Statement (FES) in his discussion of the LMFBR commercialization options presented to him in the FES.

"...The program alternatives are compared on a cost-benefit basis including the evaluation of risks resulting from acceleration of the program. They are also compared on the basis of meeting the requirement for operation of a LMFBR demonstration or large prototype plant in a utility environment and for sufficient assurance of the technical feasibility, economic competitiveness and environmental acceptability of an LMFBR economy prior to any irreversible commitment to widespread commercial deployment.

"Using the foregoing requirements, I rejected those options involving rapid acceleration of the program because of the lack of any demonstration or large plant experience and insufficient information in the areas of fuel cycle performance, reactor safety, safeguards, waste management, and health effects before a commitment would be made to commercialization. Those options involving major delays in the program were likewise deemed unacceptable because of the resulting loss of net economic benefits and of insurance against a potentially inadequate uranium resource and the inefficiencies in the conduct of the program. Finally, I rejected those program options which postulated omitting the Clinch River Breeder Reactor (CRBR) Plant because, in my judgement, the CRBR offers the most timely and cost-effective construction, licensing and operating experience essential to the successful completion of the LMFBR Program."

-- What would be the consequence of a determination in the late 1980's that the liquid metal fast breeder concept is not suitable for commercialization?

While the LMFBR commercialization decision is scheduled for 1986, problem areas of a depth and scope which might lead to a negative determination will be known well before the decision date and ERDA will be able to prepare for the eventuality in advance of the decision.

Because the LMFBR is the only breeder concept in the demonstration stage of development, it would mean a substantial delay in establishing an alternate breeder capability in the nuclear sector with the attendant penalties of greater reliance on uranium resources, higher nuclear energy costs and sector capacity limitations.

Development of alternative long-range unrestricted fuel energy forms would have to be expedited - at great expense and probably at a higher risk level.

The overall result would be reduced national energy supplies at increased cost for the period 2000-2025.

It should be noted that we have no present evidence however that indicates insurmountable problems.

The prospects for successful development and the commercialization of the LMFBR are excellent, and that the problems remaining to be solved amenable to engineering solution. The LMFBR program plan is specifically directed to solution of these problems.

-- Does not the fact that the LMFBR concept is being developed to the near exclusion of other concepts (e.g., gas-cooled fast breeder, light water breeder, molten salt breeder, heavy water breeder, etc.) mean that the nation will be in the breederless situation that ERDA fears if the LMFBR is determined in the late 1980's to be commercially not viable?

If the LMFBR is determined to be commercially not viable and is replaced by another breeder concept scheduled for later introduction, then the Nation will be in the same position it would be in with a similar LMFBR program schedule delay and with the same energy capacity and cost penalties.

The light water breeder, molten salt breeder and the heavy water breeder are not true alternatives to the LMFBR but rather advanced converters with improved neutron economy. They have the potential for creating as much fuel as they use but they are not capable of manufacturing the necessary additional fuel needed for new reactor starts on LWR reloads. Currently ERDA is conducting a major demonstration of the light water breeder at Shippingport and has initiated studies to determine applicability of the heavy water reactor to the U.S. utility industry.

The gas cooled fast breeder (GCFR) is the only other concept presently under consideration with a low enough doubling time to functionally replace the LMFBR. Studies are underway at both ERDA and General Atomic to determine the application potential and development requirements for this concept. ERDA's overall evaluation of the comparison of the LMFBR and GCFR technologies is that the LMFBR technical base is substantially more advanced for proceeding to the reactor demonstration phase. The same technical conclusion has been arrived at in France, the USSR, the UK and in the Federal Republic of Germany, in cooperation with Belgium and the Netherlands. Programs in these countries, with the assistance of early published U.S. data, have been moving rapidly and effectively forward. We, nevertheless, have the opportunity with the LMFBR program to regain leadership in the effort to reach commercialization.

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-- Does not the nearly complete focus on the LMFBR mean a de facto commitment to this technology?

In regard to a commitment, de facto or otherwise, to the LMFBR technology, it should be emphasized that following an ERDA decision on commercialization, the utility industry and the public would then determine the extent, if any, LMFBR technology would be commercially deployed.

The Administrator addressed the subject of ERDA commitment to LMFBR commercialization in his Findings on the LMFBR Final Environmental Statement:

"To be meaningful, ERDA's decision on commercialization must be made before any commitment to widespread deployment becomes irreversible. In this connection, I do not find that implementation of the LMFBR Program as structured above (reference case), would constitute an irreversible commitment to widespread commercial use in 1986. At that time CRBR would have been in operation three years, construction would have been largely completed on the PLBR, and the CBR would still be in the design stage. The level of program involvement of the industrial sector would be minor compared to the investment required to place LMFBR technology in widespread use. Moreover, if ERDA were to determine that the problems involved in widespread deployment could not be resolved satisfactorily, the Nuclear Regulatory Commission would almost surely refuse to license LMFBR plants.

"Nor do I find that continuation of the LMFBR Program, as structured above, would inevitably short-change the development of other technology programs for the long term production and conservation of energy. Indeed, these technological alternatives are receiving substantially increased new appropriations and are proceeding as rapidly as possible consistent with prudent management."

3. <u>It is necessary to proceed immediately with the CRBR in order to obtain experience with a LMFBR intermediate in size between the FFTF reactor and the Near Commercial Breeder Reactor (NCBR).</u>

— What precisely is it that will be learned from the CRBR that could not be learned from the FFTF and sodium test facilities?

Information from the design, construction, and operation of CRBRP which cannot be obtained from FFTF, includes: the valuable engineering experience of actually designing and manufacturing equipment for an LMFBR plant approximately two and one-half times the power of FFTF and approximately one third of the expected power of a commercial LMFBR; operation of these integrated "intermediate" size LMFBR systems to produce steam for generating electricity; demonstration that LMFBR's can be licensed in a timely manner similar to commercial LWR plants currently being constructed; performance responses of an LMFBR to transients of a utility power distribution grid; and determination of the overall ability of a large size LMFBR to operate within the regimentation and discipline required of a plant which is part of a utility grid.

Sodium test facilities can provide valuable information for design, manufacturing and operation of large individual LMFBR plant components or systems, but they cannot provide an integrated test of all the equipment. Also sodium test facilities cannot provide tests of a large reactor core, the experience of operating on a utility power distribution grid, or the demonstration of the licensability of LMFBR's.

--Do you agree with the Joint Committee on Atomic Energy Ad Hoc Subcommittee to Review the Liquid Metal Fast Breeder Reactor Program statement in its report (page 74) that even a redesigned CRBR would be ". . . obsolete with respect to the then-current technology . . ." and, if so, how relevant will be the CRBR operating experience to future commercial breeders?

The quoted phrase, taken out of context of the entire paragraph, is misleading. Design and construction activities on CRBRP will last more than ten years. In any complex, long-duration development project such as this, there is necessarily an on-going change of the understanding of the technology. Whenever technology is frozen into design, that part will tend to lag behind other developments in the same technological field. The pace of development in that technological field will have a strong influence upon the rate at which technological developments which have been frozen into the design become outdated. Those features of LMFBR technology which are currently adaptable to the operating plant design for the CRBRP - at the time that it must be incorporated into the design in order to maintain the schedule - may become progressively outdated. It is expected, however, that technology aging will occur over an extended period of years, not over a brief time interval.

In almost all equipment and concepts, the CRBRP is designed to provide experience which will be highly applicable to future commercial plants. The operating experience with these concepts and equipment will serve to provide a solid test bed of information for further developmental work that will lead to improvements in operation of subsequent power generation plants. In addition, the CRBRP is to demonstrate advances that are possible in the fast breeder reactor fuel design and fuel assembly as well as to test the reload or refueling operations under the circumstances of actual power plant operation, where downtimes must be minimized for the sake of overall competitive pricing of the electric power output of the plant. It should be recognized that valuable experience was and is still being obtained from the first several large-scale PWR plants (Shippingport, Yankee Rowe, etc.) even though succeeding plants were of a more current design.

-- What information will the CRBR provide that can assist in determining the economic viability of commercial LMFBRs?

The principal result from the CRBRP in demonstrating economic viability of commercial LMFBR's will be found in the interrelated way in which the plant can be kept on line producing salable power, that is to say, in demonstrating the availability of the plant for operating at its average and peak power levels over extended periods of time. Subsidiary lessons to be learned which impact economics of commercial LMFBR's are (i) doubling time of the fuel cycle, (ii) required downtime for refueling and preventative maintenance, (iii) number of operations and maintenance personnel required, (iv) the portion of the electricity generated which must be used to operate the plant, and (v) materials needed to support operations and maintenance. Additionally, the CRBRP will provide information on costs of designing and manufacturing LMFBR equipment, and constructing an LMFBR. This cost information can be adjusted for size, year of construction, escalation, separation of first-of-a-kind development costs, etc. to provide information useful for estimating costs of commercial LMFBR's.

4. <u>It is important to proceed with the CRBRP in accordance with the ERDA schedule in order to maintain the cohesiveness and skills of design and construction teams.</u>

-- Why cannot teams be assigned to design of other reactor projects (e.g., a 1000 MW CRBR, more efficient converter reactors, etc.) while data is being obtained from the FFTF and sodium test facilities?

It has required five years to mobilize the CRBRP Project to its present state of readiness for proceeding with the project. If project momentum were lost, it would probably take a comparable length of time to regain this momentum. Many of the engineers and technicians have gained experience on FFTF which will be directly applicable to CRBRP. Now that FFTF has reached the stage of completion where their particular expertise is no longer required, many have begun making an orderly transition to comparable areas of work on CRBRP in order to most efficiently utilize this experience. Although some of these engineers and technicians could be assigned to other work including large (approximately 1000 MWe) plant design work and activities to increase converter reactor efficiency, this would be inefficient utilization of their specialized capabilities and others who could not be reassigned would be lost to the program. The teams would effectively be disbursed. Rather than moving efficiently from work on FFTF to CRBRP and later the Prototype Large Breeder in preparation for commercialization, these cadres of highly trained people would have to be demobilized, while waiting several years for results from FFTF and major test facilities, and remobilized to continue work on CRBRP.

Assembling these design teams for complex high technology programs and projects which span several years is a difficult and lengthy process. The major industrial and utility participants and a large number of participating subcontractor organizations have carefully assembled over a several year period their highly trained cadres of scientists, engineers and technicians. These cadres of people with LMFBR capability have been built up and held together in significant measure by participation in FFTF and CRBRP and by the prospect of other future participation in the LMFBR program as it expands. If these groups are disassembled, it will be difficult in most cases, and impossible in some, to recover the specific experience that will be lost.

-- What are the skills that would be lost and where would they go were the CRBR to be delayed?

The principal skills that would be lost include those associated with the detailed design, engineering and manufacturing of specialized LMFBR plant components, systems and structures as well as those skills necessary for core design, safety analysis, licensing, reactor plant construction and reactor plant operation. If CRBRP were delayed, a portion of the personnel would be transferred to other groups in the participants' organizations and would be potentially available in the future. Many others would simply be forced to find employment in other fields due to the limited opportunities in the LMFBR program if CRBRP were delayed. Many of the utility professionals who are participating in the project also would be reassigned to other work so that the LMFBR skills which they have developed would be largely lost to the utilities, delaying the transfer of LMFBR technology from government to industry.

The loss of skills here described would be very real if the project were delayed. Such losses have happened before when projects were delayed or cancelled. When personnel find other employment after an organization breaks up, the likelihood of regrouping them is small.

— How many engineers and technicians are currently involved in the design teams?

Approximately 1,200 professional engineering and technical personnel are currently employed by the principal contractors on the project. Additionally, over 100 professionals are also employed by ERDA and the Project Management Corporation in its project management staff.

The above numbers do not include the several hundred professionals employed by the many subcontractor organizations responsible for the design, fabrication, and delivery of plant components and high technology materials. Also excluded from the above numbers are the personnel employed by the National Laboratories and the private contractors who are performing substantial engineering and developmental effort in support of the CRBRP.

-- Who currently employs the design teams?

Most of the design teams for the CRBRP are employed by the principal contractors on the project. Burns and Roe is the architect-engineer and Stone and Webster is the contractor. The reactor manufacturers responsible for overall system design are Westinghouse, General Electric and Atomics International. Westinghouse has the lead responsibility for the reactor manufacturer function.

In addition, the National Laboratories and many reactor component manufacturers are performing design functions necessary for elements of the project. The component manufacturers providing equipment for CRBRP include:

Babcock & Wilcox
Foster Wheeler
Byron Jackson
Chicago Bridge and Iron
Royal Industries
General Electric Large Motor and Generator Department
Wyatt Industries
Ingersoll-Rand
Allis-Chalmers

ERDA and PMC also maintain an experienced staff to perform its overall project management responsibility.

— What are the projects in addition to the CRBRP which ERDA envisions assigning to these design teams?

The overall LMFBR Program is aimed at making this energy option available for commercialization and future widespread use. In 1986 the ERDA Administrator is scheduled to make a decision on whether or not LMFBR's are suitable for widespread deployment. Prior to that date, there are plant development activities (including FFTF and CRBRP), sodium facilities construction and operation activities and other program tasks which must be successfully completed to support this decision. Concomitantly, much of the technology must be transferred from government to private industry. In order to achieve this, current plans call for designers, engineers and technicians to be assigned to FFTF, CRBRP, the Prototype Large Breeder Reactor, the High Performance Fuel Laboratory, the Plant Components Test Facility, a large Safety Research Facility, a Hot Pilot Plant (for fuel recycle) and numerous other smaller projects associated with providing facilities for developing LMFBR equipment and testing LMFBR plant components and safety features.

-- What experience is there with major projects to indicate that it is important to maintain the existence of design teams over such extended periods?

The entire history and continued success of the Naval Reactors Program has proved the value of developing and expanding a body of technological and management expertise and experience to enable the provision of a full production capability of necessary applied technology when required. In addition, the creation and expansion of the knowledge and expertise necessary for the design, development and construction of the first converter reactors designed to produce electrical energy (Shippingport, Yankee Rowe, etc.) provided a sound basis for the development of a viable commercial converter reactor industry. There are currently 57 converter reactors licensed and being operated by utilities in this country, and an additional 85 are under construction. All of these reactors have been designed by an expansion of the same basic design teams. The assistance of these design teams built up over a period of more than 25 years has been essential to the indicated development.

-- Is there not a danger that long lasting design teams will grow stale, will resist new solutions, and will not admit past mistakes?

The design teams are not static. There is a continuing flow of personnel through them--older members retiring or moving to other jobs outside the teams and younger personnel moving in to take their place. The accumulated experience is passed to the newer members.

We do not consider that there is a danger of these design teams growing stale or not admitting past mistakes. Rather, we believe that these teams will avoid repeating mistakes of the past and provide for an ever-increasing capability. In contrast, new teams would have to study past experience and, while the experience is well documented, the finer points of good design would have to be learned by trial and error by these new teams as experience has shown.

-- If maintenance of design teams is important, should not something be done to keep together the General Atomics HTGR design group which could be valuable in an effort to make a more definitive assessment of the HTGR technology?

To maintain the HTGR reactor class in the national reactor program, it will be essential to keep the industrial design group together and functioning. To do this, current ERDA funding levels are being maintained at General Atomics Corporation while studies are being conducted at both General Atomics and through ERDA to reassess the potential of gas cooled reactor systems in the U.S. There is interest in process heat applications as well as electrical energy generation because of the potential of these systems for high temperature operations.

-- How does ERDA envision the transfer of design teams' expertise to the industry that will produce commercial breeders?

The plan for the commercialization of the breeder requires the continuous wide spread involvement of the industry's architect-engineers, constructors, reactor manufacturers and component manufacturers as well as the participation of the nations utility industry. There is, therefore, no transfer of expertise as such, but rather a continuous development of an industrial capability. For example, the CRBRP Project is a cooperative venture of the government, represented by ERDA, and over 740 utilities, represented by the Project Management Corporation, who have contracted to private industry the design, construction and testing of this large scale breeder reactor plant. Subsequent plants in ERDA's plan to commercialize the breeder will also be designed and constructed by private industrial organizations.

5. <u>The CRBRP will produce important experience with a breeder which produces electric power that is fed into a utility grid.</u>

-- What is the nature of this experience and why is it important?

The CRBRP demonstration plant, along with the related industrial engineering efforts, will serve as an important step in effecting the transition of the breeder reactor program from the technology development stage to the point of readiness for large-scale commercial utilization.

The CRBRP demonstration plant is the first point at which utility companies become deeply involved in the demonstration of the LMFBR concept. Each involved utility evaluates the technology in terms of its own needs and methods of operating, factoring its requirements into the program. At the same time, the utilities develop their capability to maintain and operate power plants of this type. This plant also constitutes a step increase in the involvement of industrial suppliers, because it now involves a utility-related power plant designed to demonstrate commercial application potential rather than simply a government-owned facility. Thus, there is a commercial overtone to the relationship because of the expectation that the utilities may someday make purchases of LMFBR's from reactor manufacturers. At this point, therefore, development of the industrial base has become broader with industry expected to develop sufficient breadth so that the utilities will eventually have a number of industrial companies from which to purchase LMFBR plants.

The construction and operation of an LMFBR demonstration plant will provide practical experience on the functioning of essential plant components. More importantly, however, it will provide data and experience on operation of a large scale power plant system and the interaction of that system with its associated supporting facilities and with the local environment. A firmer grasp will be obtained on the range of costs and other factors of interest to energy development and use. Construction and operation will also play an essential role in determining the safety, reliability, economics, and environmental impact in the context of the utilization of the LMFBR on electric power systems. With such data and experience, the validity of the LMFBR as the Nation's prime candidate for assuring long term abundance of energy may be demonstrated.

-- How is this experience relevant since it is admitted that the CRBRP will bear little resemblance to the commercial LMFBR?

It is expected that the CRBRP will be quite similar to commercial LMFBR's in most important respects. The fuel design and the concepts for the major components will probably be the same. Of course, the size of commercial LMFBR's will be greater and there will be attendant improvements in components and systems based on future development and test programs. This progression will be exactly analogous to the development of LWR plants. In that case, the first several plants are about 10 to 20% of the rating of the later generation of power plants but many of the concepts are identical. In most cases, the differences are strictly scale-ups. It should be noted that all the early LWR plants are still operating, are still providing valuable experience, and are producing power usually more economically than fossil plants.

Therefore, it is expected that operating experience from the CRBRP will be just as relevant and just as valuable for future LMFBR plants as the experience from the first LWR plant (Shippingport) was to future LWR plants.

Enclosure 4

Projected Federal Expenditures for Fast Flux Test Facility
and the Prototype Large Breeder Reactor

		Thru FY75	FY76	FY7T	FY77	FY78	FY79	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96-FY2000	FY2001-FY2020	TOTAL FY76-FY2020	TOTAL PROGRAM
Fast Flux Test Facility (FFTF)	Operation	267	49	14	50	53	45	45	45	45	45	45	45	45	45	45	45	45	45	45	40	27	11	5	-	870	1146
	Engineering	12	3	-	2	2	1	3.2	3.2	3.2	3.1	3.1	3.0	3.0	2.9	2.7	2.7	3.0	3.3	2.9	2.9	1.7	0.5	0.4	-	53	65
	Construction	324	80	-	80	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	190	540
Subtotal	FFTF	620	132	14	132	95	46	48	48	48	48	48	48	48	48	48	48	48	48	48	43	29	12	5	-	1131	1751
Clinch River Breeder Reactor Plant	Operations	31.8	57.0	15.1	171.0	226.2	319.1	328.1	277.6	141.4	60.6	33.5	22.1	14.4	(14.0)*	(33.9)*	(17.8)*	-	-	-						1690.6	1682.4

Prototype Large Breeder Reactor — Design studies are underway now for the PLBR. The ERDA is already planning development programs in support of the plant. It has not been decided if subsidies will be needed.

"In addition to providing answers to the foregoing questions, please provide a tabulation of Federal expenditures to date and future Federal expenditures by year on the Fast Flux Test Facility, the Sodium Pump Test Facility, the Sodium Component Test Installation and the the proposed Large Prototype Breeder Reactors."

*Net revenue from plant operations.

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"In addition to providing answers to the foregoing questions, please provide a tabulation of Federal expenditures to date and future Federal Expend[illegible]es by year on the Fast Flux Test Facility, the Sod[illegible] Pump Test Facility, the Sodium Component Test Installation, and the two proposed Large Prototype Breeder Reactors."

Projected Federal Expend[illegible]es for the Sodium Components Test [illegible]allation

	EXP FY1975 AND PRIOR	FY76	FY76A	FY77	FY78	FY79	FY80	FY81	FY82*
OPERATING									
SCTI Test Operations & Facility Maintenance	10.5								
Test Operation Preparation, Installation & Facility Adaptation	6.2								
SCTI Test Operations		2.0	0.5	1.9	2.8	3.0	3.0	3.0	3.0
Engineering Support for Tests		0.3	0.03	.05	.4				
Conceptual Design of 2nd Test Bay		0.1	-	0.5	0.2				
Adaptation of SCTI for CRBR Steam Generator Tests		3.2	0.5	6.4	4.8	2.6	3.3	2.5	1.4
Dissamble, Package & Ship FFTF Dump Heat Exchanger		0.56	0.29						
CONSTRUCTION BA/BO									
Facility Capitalization thru FY66	3.8								
69-30 Minor Additions to Steam & Feedwater Sys	1.11								
Modification of SCTI for Heat Exchanger Test Bay	3.0								
Modifications under General Plant Project	.77								
70-6-6 Upgrade Steam & Feedwater System to 70 MWT Cap		7.7/.5	/.5	/4.3	/2.4				
Design, Build - 2nd Test Bay					18.0/6.0	/8.0	/4.0		
Provide Oil/gas capability for 70MWT Sys		1.5/.050	/.070	/1.04	/.34				
Upgrade Facility Control Room		.036/.167	/.010	/.510	/.250				
Equipment**	4.4	3.9	.27	1.56	.87	.24	.24	.24	.24
Summary									
Operating	16.7	6.2	1.32	8.9	8.2	5.6	3.?	5.5	4.4
Construction	8.7	.72	.60	5.8	9.0	8.0	4.0		
Equipment	7.[illegible]	3.9	.27	1.56	.87	.24	.24	.24	.24

*Budget data beyond FY82 for SCTI not available since test articles and test programs are not firm beyond that time.

**Includes alternate heater purchase and installation

"In addition to providing answers to the f going questions, please provide a tabulation of Federal Expenditures to date and future Federal Expendit by year on the Fast Flux Test Facility, the Sodi. Pump Test Facility, the Sodium Component Test Installation, and the two proposed Large Prototype Breeder Reactors."

3

Projected Federal Expendit for the Sodium Pump Test Facility

	EXP FY1975 AND PRIOR	FY76	FY76A	FY77	FY78	FY79	FY80	FY81	FY82*
OPERATING									
Conceptual Design, Spare Parts Training Startup	1.97								
FSTF Prototype Pump Installation Package	3.70								
SPTF Related R&D, Project Engineering Activities	9.67								
SPTF Test Operations		2.7	0.7	2.2	2.7	2.7	2.2	2.2	2.7
Adaptation of SPTF to Test Other pumps		0.8	0.4	1.8	2.1	0.5	1.4	3.7	2.1
CONSTRUCTION BA/BO									
SPTF Line Item 66-4a	17.6								
SPTF Bypass to increase flow to 100,000 GPM						10/2.0	0/6.0	0/2.0	
SPTF Second Test Stand ("Pees to Reactors" Candidate)				1.5/.6	/.9				
Equipment not related to Const.	0.4	.21	.06	.18	.21	.21	.18	.18	.21
Specific CPP Items			.31/.31				1.2/.65	.55	
SUMMARY									
Operating	15.3	3.5	1.1	4.0	4.8	3.2	3.6	5.9	4.8
Construction	17.6		.3	.6	.9	.2	6.7	2.6	
Equipment	.4	.2	.06	.18	.21	.21	.18	.18	.21

NOTES
*Budget Data beyond FY82 for SPTF not available since test articles and test programs are not firm beyond that time.

x/y: X= Authorization
y= Outlay

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

May 21, 1976

COPY

Dr. Robert C. Seamans, Jr.
Administrator
Energy Research and Development Administration
20 Massachusetts Avenue
Washington, D.C. 20545

Dear Dr. Seamans:

Thank you for your prompt response to my questions concerning the breeder reactor development program. Your memorandum has been made available to Subcommittee members for their use in the ERDA authorization debate.

I remain concerned, however, that the nation is in the process of making a premature and irrevocable commitment to the liquid metal fast breeder technology. That this is the case is suggested by the fact that other breeder concepts are receiving insufficient support to allow serious consideration of them as alternatives to the LMFBR. Therefore, in 1986 we may very well find ourselves confronted with exorbitant uranium prices or a breeder that is far from optimal with regard to safety and economy of operation.

So that there might be a public record on this matter which is as complete as possible, I would appreciate answers to the following questions which arise from your previous response:

(1) Under the various FEA and ERDA assumptions concerning growth in electric power demand (as enumerated in Dr. Roberts' memorandum of May 4, 1976), how many large (greater than 500 megawatt) electric generating stations will be placed in operation prior to the year 2000? (Please categorize by year and by type; i.e. coal, oil, nuclear [converter], nuclear [breeder], other.)

Dr. Robert C. Seamans, Jr. May 21, 1976

(2) What would be the construction cost of a prototype 350 megawatt light water reactor which produced at least as much fuel as it consumed? A 350 megawatt heavy water reactor? A 350 megawatt gas cooled reactor?

(3) What would be the costs of the above reactors if the purpose were to construct prototypes which in the course of their lifetime required the mining of 1500 tons of uranium or less?

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

JUN 17 1976

Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior
and Insular Affairs
House of Representatives

Dear Mr. Chairman:

Dr. Seamans has requested that I respond to your letter of May 21, 1976, requesting additional information on alternative breeder and near breeder reactors.

It is important to note that in an expanding power economy, only a breeder reactor with a high enough breeding ratio to create new fuel at least as fast as required for new capacity additions can truly reduce the requirements for uranium ore. Thermal breeders such as heavy or light water reactor systems cannot meet this requirement. Thus, only fast breeder systems offer the promise of a truly "inexhaustible" energy source if we are to maintain any kind of energy growth rate. The present program calls for priority development of the LMFBR as the system most likely to meet the Nation's needs for a breeder. The Gas-Cooled Fast Breeder Reactor (GCFR) is a possible substitute for the LMFBR, and ERDA support for the GCFR program is continuing. However, the GCFR concept is not nearly as developed as the LMFBR concept and to develop the GCFR concept to a commercial reality would require more money than will be required for the LMFBR. Further, any shift from the LMFBR to a GCFR priority would substantially delay commercial introduction of the breeder.

Thermal breeders, such as light water concepts (LWBR) or heavy water concepts, can only be expected to achieve breeding ratios slightly above unity. This means they can generate only enough fuel to sustain themselves. In an expanding power economy, new capacity additions must be fueled initially through the burning of uranium-235 or existing plutonium in order to create new breeder fuel (uranium-233). For instance, to start a LWBR, a "pre-breeder" reactor must be built and operated for 10 to 15 years to create the fuel to start one breeder reactor. In an expanding power economy, therefore, it is possible that introduction of an LWBR may not appreciably reduce uranium consumption until such time as power demand slows. Thermal breeders can

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be used indefinitely to maintain a constant power output, but unless we are sure that a no-growth energy policy is acceptable to the country, thermal breeders should be thought of only as supplements to the LMFBR, not substitutes. Similarly, thermal near breeders can provide some backup to the breeder, but cannot eliminate the need for uranium even in a static equilibrium condition.

In summary, the introduction of thermal breeders or near breeders over the next several decades appears unlikely to significantly affect the rate of uranium usage during that period. Only in certain conditions can thermal breeders or near breeders provide significant stretchout of time before fast breeder introduction is required, and only in no-growth nuclear sector situations can thermal breeders act as true substitutes for fast breeders.

In considering the question of comparative costs of building different breeder or near-breeder reactor types, it is important to remember that thermal breeder concepts do not fulfill the same needs as fast breeder concepts, and they should not be compared on the same basis.

It should also be noted that the actual demonstration phase of any reactor concept is apt to be very expensive and that much of this expense is involved in areas such as: safety and environmental research, transfer of technology to industry, first-of-a-kind costs, licensing requirements, and standards development. The actual demonstration plant cost differences due to inherent differences between reactor types, in fact, are apt to be much less than the cost differences caused by differing external conditions or goals of the demonstration plant. In short, while projected theoretical costs of other reactor concepts might appear to be well under the cost estimates for the Clinch River reactor, it is quite likely that the total cost of actually demonstrating any other reactor concept would be quite comparable.

This does not mean that other reactor concepts are not being evaluated and supported. The Light Water Breeder Reactor concept is being supported to demonstrate scientific feasibility of the concept, and the Gas-Cooled Breeder Reactor concept is being assessed. The potential of the thorium fuel cycle to extend uranium resources is also being assessed. The interrelationships between converter and breeder fuel cycles are being studied to optimize overall fuel utilization efficiencies. These studies and future periodic position reassessments will provide a continuing basis for the ERDA nuclear option development programs.

Responses to the specific questions itemized in your letter of May 21, 1976, are provided as an enclosure to this letter. Please let us know if you desire further discussion of these issues.

Sincerely,

Richard W. Roberts
Richard W. Roberts
Assistant Administrator
for Nuclear Energy

Enclosure:
Response to Questions

cc: Honorable Alan Steelman
House of Representatives

Response to Questions

1. Under the various FEA and ERDA assumptions concerning growth in electric power demand (as enumerated in Dr. Roberts' memorandum of May 4, 1976), how many large (greater than 500 megawatt) electric generating stations will be placed in operation prior to the year 2000? (Please categorize by year and by type; i.e., coal, oil, nuclear [converter], nuclear [breeder], other.)

Again it should be understood that the ERDA program is not predicted on a specific growth rate projection. A broad array of scenarios are examined to study programmatic impact under differing energy demand conditions.

In response to the question a representative scenario has been selected. While the numbers will change with differing assumptions, this case represents a reasonable base. While a breakdown on individual plant sizes and on the division of fossil fuel between coal, oil and gas would be very speculative, some general observations are possible.

All of the nuclear reactors (except the first few breeders) built after 1975 are expected to be in the 1000 to 1300 MWe range. Most of the fossil central station plants can be expected to be above 500 MWe, many will be above 1000 MWe. Also most of these plants will probably be coal fired by the year 2000. All internal combustion and gas turbine (IC/GT) plants will be less than 500 MWe, and based on current technology, these plants will be less than 100 or 200 MWe. IC/GT plants will probably be the major utility consumers of oil and natural gas in the year 2000.

The categories for this case are shown by year in the following table.

CUMULATIVE INSTALLED ELECTRICAL GENERATING CAPACITY BY PLANT TYPE (GWE)

Year	Fossil & Other Central Station Plants	Nuclear Converters	Nuclear Breeders	Internal* Combustion and Gas Turbines	Hydro	Σ
1975	347.2	37.2	-	43.3	64.3	492
1980	411.0	70.5	-	51.0	72.5	605
1989	481.5	159.65	.35	57.5	86.0	785
1990	532.0	283.85	1.15	64.0	99.0	980
1995	597.0	438	7.0	74.0	114.0	1230
2000	715.0	564	61.0	85.0	125.0	1550

*All of these plants will be less than 500 MWe.

2. <u>What would be the construction cost of a prototype 350 megawatt light water reactor which produced at least as much fuel as it consumed? A 350 megawatt heavy water reactor? A 350 megawatt gas cooled reactor?</u>

The question implies obvious concern that the high cost of the 350 megawatt Clinch River liquid metal breeder demonstration plant is specific to the LMFBR concept and could be avoided by going by another reactor type. It is very important to realize that all studies to date have indicated that the seemingly high cost of the Clinch River project are heavily related to the <u>demonstration</u> aspects of the Clinch River project and not to the reactor type. The Clinch River project is not being built just to show scientific feasibility, but also has to bear the costs of:

- Development of codes and standards for use in a real commercial market.

- R and D program support to demonstrate safety and environmental aspects of reactor.

- Provision for technology transfer to a wide industrial base.

- Development of licensing envelope within which future commercial plants can operate.

- First-of-a-kind costs associated with a new reactor.

If a 350 megawatt plant of any of the reactor types mentioned were to serve all of the purposes of a true demonstration reactor such as the Clinch River plant, then it would also have to bear much or all of the costs associated with the items mentioned above. Since these costs tend to dominate the cost of a demonstration reactor, it is not expected that the full construction cost of a 350 megawatt breeder demonstration plant of any other reactor type would be significantly different from that of the Clinch River project (800 million) if it could be started on the same schedule as the Clinch River project. In fact, since the actual construction of another type demonstration reactor would take many years to start, inflation could significantly raise the cost beyond that of the Clinch River project.

The above does not mean that the cost of constructing a reactor prototype is independent of the reactor design being considered, but does indicate that the purposes and conditions under which a demonstration reactor is built is apt to greatly influence the total project cost. For these reasons it is impossible to make a definitive statement about the cost of building other prototype 350 megawatt breeder reactors without further definition of the conditions and goals under which these reactors would be built. General comments about the various reactor types, however, can be made on the basis of present information.

- LMFBR breeders. Independent, detailed studies along with actual plant construction cost data suggest that LMFBR's as a reactor type should cost no more than 20% more than the present type of light water reactors. Recent French experience, in fact, suggests a cost differential of only 1.5%.

- Gas-cooled breeders. Gas-cooled breeder reactor technology is not as well developed as is LMFBR technology and more time and base program support would be required to build a gas-cooled breeder demonstration plant than a LMFBR demonstration plant. Present studies also indicate that the final capital costs of a gas-cooled breeder would tend to be higher than that of a LMFBR.

- Heavy water breeder. This concept could build upon parts of the Canadian CANDU system technology which would help total system costs, but it must be recognized that CANDU systems are not now licensable in this country and additional base support on licensing, safety and standard support would be needed. Further, the present CANDU-type reactors are not developed as breeder reactors and detailed designs for heavy water breeder reactors do not exist. On the basis of CANDU costs, however, the capital costs of heavy water systems can be expected to be greater than that of light water reactors and not significantly different from sodium cooled breeders.

- Light water breeders. A light water breeder reactor could obviously build upon the present light water reactor technology which already exists in this country. This could potentially result in significant total demonstration project cost savings. However, it must be recognized that the breeding principle has not yet been demonstrated. ERDA is thus proceeding to prove (or disprove) the principle of light water breeding by the installation of a Light Water Breeder Reactor (LWBR) core in the Shippingport reactor. Assuming successful scientific demonstration of the LWBR concept, ERDA could begin a larger scale demonstration reactor some time in the early 1980's. However, detailed cost estimates for this concept are somewhat premature at this time. It may be possible to demonstrate this concept at about the 350 MWe level using an existing LWR plant. In this case the cost might be considerably reduced.

Finally, it should be noted that neither a light water nor a heavy water thermal breeder concept is a true substitute for the LMFBR. Only the gas-cooled breeder concept could offer a real substitute for the LMFBR in a growing power demand situation. Comparisons of the costs between thermal breeder systems and LMFBR systems can, therefore, be very misleading.

3. <u>What would be the costs of the above reactors if the purpose were to construct prototypes which in the course of their lifetime required the mining of 1500 tons of uranium or less?</u>

The comments about the cost of demonstration reactors being largely influenced by factors other than the basic reactor design, explained in the previous answer, also apply to near breeder reactors. General comments about near breeder systems costs, however, are given below.

- <u>Gas-cooled near breeder</u>. Given development of a true commercial gas reactor such as the HTGR, the development of a gas-cooled reactor which would use less than 1500 tons of uranium in its lifetime would be a feasible technological extension. However, without Government help, no further industrial development of the gas reactor concept is expected. To develop this concept would require Government assistance in the expensive commercial demonstration phase and would require the development of a thorium recycle process technology. Estimated costs for commercial demonstration of the HTGR concept and the thorium fuel cycle are in the several billion dollar range.

- <u>Heavy water near breeder</u>. The presently developed heavy water CANDU reactor system is based on a throwaway fuel cycle which requires about the same fuel input as present light water reactors. To develop a heavy water near breeder which would have a lifetime requirement of less than 1500 tons of uranium is possible, but this will require development of advanced reactor designs and the development of a thorium fuel cycle capability. The costs of establishing the safety and licensing criteria of the heavy water concept in this country would also have to be included in a demonstration program. It should also be noted that high conversion heavy water designs inherently mean higher D_2O inventories, high capital cost, and high fuel cycle costs. In fact, because of the high fuel throughput required, fuel reprocessing costs can become exorbidant.

- <u>Light water near breeder</u>. A light water near breeder could be developed using much of the existing light water technology. However, a thorium fuel cycle would have to be established in addition to the demonstration of the reactor concept so that the total demonstration cost would still be high. In addition, it should be noted that while the light water near breeder demonstration plant phase might be accomplished at less cost than for heavy water or gas concepts, preliminary design studies indicate that an ultimate commercial light water high conversion reactor would tend to be less economic than either a heavy water or gas high conversion reactor.

XIX. ERDA Involvement in Transportation Security

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

April 27, 1976

COPY

Dr. Robert C. Seamans, Jr.
Administrator
Energy Research and Development Administration
20 Massachusetts Ave.
Washington, D.C. 20545

Dear Dr. Seamans:

The April 22 issue of Nucleonics Week reports that by October 1, 1976, the ERDA transportation system will be used for shipment of strategic quantities of ERDA-owned special nuclear materials. As you are aware, private shippers contend that they can provide whatever level of security that ERDA might require, and that such security will be equivalent to that provided by the ERDA system.

Since the rationale underlying this decision might apply equally well to future decisions concerning the shipment of privately owned special nuclear materials, I would appreciate your providing me the reasoning behind your determination. I would also like to know whether this logic has led you to conclude that the NRC should require that strategic quantities of privately owned nuclear materials be transported by a government owned transportation system.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and the Environment

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

JUN 29 1976

Honorable Morris Udall
House of Representatives

Dear Mr. Udall:

Dr. Seamans has requested that I answer your letter of April 27, 1976, concerning the Energy Research and Development Administration (ERDA) program for transporting strategic quantities of ERDA-owned special nuclear material (SNM) moving by highway, as reported in the April 22, 1976, issue of Nucleonics Week magazine. This is in furtherance of an interim reply to you on this matter by Mr. H. H. Cantus, Director, Congressional Relations, ERDA.

The former Atomic Energy Commission in August 1974 made the decision to improve the then existing experienced, highway, nuclear, weapons transportation system and to extend it to cover strategic quantities of Government-owned SNM. In 1975 and 1976, Congress authorized and appropriated funds for improvement of the system and its expansion to handle the non-weapons special nuclear material. The improved system will be ready for full operation by October 1, 1976.

Recently the Office of Management and Budget (OMB) has asked us certain questions and for certain analyses with respect to the system's expansion to handle the non-weapons SNM. We are studying these questions and will have the answers shortly. As soon as the reviews with the OMB are completed, I shall inform you further on this matter.

Sincerely,

Alfred D. Starbird
Alfred D. Starbird
Assistant Administrator
for National Security

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

AUG 27 1976

Honorable Morris Udall
House of Representatives

Dear Mr. Udall:

On June 29, 1976, I wrote to you at Dr. Seamans' request concerning the plans of the Energy Research and Development Administration (ERDA) to extend the coverage of its existing transportation system for highway movement of nuclear weapons to include shipment of strategic quantities of ERDA-owned special nuclear material (SNM).

The decision to include shipments of nonweapons SNM was made by the Atomic Energy Commission (AEC) on August 2, 1974. On March 29, 1976, after thorough reexamination, that earlier decision was reaffirmed by the Administrator of Energy Research and Development. In reaching this decision, the Administrator determined that the most effective and efficient security would be provided by expansion of the existing ERDA system's shipments to cover all strategic quantities of ERDA-owned SNM, and that this security was essential considering the large number of shipments involved.

The decision to enlarge the coverage of our ERDA highway transportation system was reached only after careful review of all the factors of comparison between an integrated Federal system and one which would include some degree of commercial participation. While ERDA remains firmly committed to a policy of reliance on the private sector to supply its needs and provide its services, we are convinced in this particular case that there is a compelling basis for the judgment that ERDA can best fulfill its responsibilities for transporting weapons and strategic quantities of Government-owned SNM with the required degree of safety and security by using its own unified, single-manager transportation system. Among the factors supporting this judgment are: the added deterrent effect associated with a recognized Federal force; the enhanced authority to command and control the integrated transportation system and the individuals operating that system; the inherent planning and operational flexibility in a single, unified weapons/SNM system; the improved cost effectiveness, management, and manpower utilization of such a dual-purpose system; the consistency of policy and procedures employed for each operation; the increased effectiveness of coordination and cooperation with state, local, and other Federal agencies, including

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the DoD; the possible greater potential responsiveness of Government-employed personnel to ERDA direction in an emergency; the advantages of using guards trained for the protection of weapons for SNM shipments as well; and the assurance that shipments related to military requirements would not be adversely impacted by potential strikes or strike threats.

In summary, in reaching decisions concerning our ERDA transportation responsibilities, we have been acutely aware of the need to optimize the security of the transportation system. The potential for serious consequences--should the security of SNM prove inadequate--is so great that we feel a strong obligation to achieve maximum assurance that ERDA has done all it can to protect its shipments of SNM as well as weapons. We believe our planned system accomplishes this in the most effective and efficient manner.

Earlier this year, the Edlow International Company, a transportation management contractor who obtains transportation services by subcontracting, requested the Office of Management and Budget (OMB) to review this matter and the basis for the policy of using the all-Federal transportation system planned by ERDA. In this connection, the OMB asked ERDA to provide an economic analysis comparing the Federal system with alternatives which involved varying degrees of participation by private industry. ERDA provided informally to the OMB on July 7, 1976, the final version of the analysis requested. The analysis showed that the Federal system, with its coverage extended to SNM shipments, could be operated more economically than options involving a split Federal/contractor approach. After its review of the analysis, the OMB informed ERDA on August 23, 1976, that it supported the decision of the Administrator of ERDA. In view of the OMB action, we are proceeding to complete the implementation of our plans for a unified Federal (ERDA) transportation system, to include movement of the SNM referred to above, by October 1976.

In your letter you also inquired regarding what bearing our determination might have on possible subsequent requirements of the Nuclear Regulatory Commission (NRC) with respect to transportation of strategic quantities of privately owned nuclear materials. In this regard, it is the clear position of ERDA that its decision is not intended to influence future actions by the NRC, nor should it be regarded as so doing. The ERDA decision stands alone on its own merits and has been arrived at using a particular set of circumstances and factors unique to ERDA. We believe that another Federal agency, such as the NRC, could reach different determinations based on different requirements and considerations. Such determinations might not include a Government-owned transportation system as a necessary feature of providing adequate

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security. We do not believe that the decisions by ERDA should be regarded as constraining to the NRC; and, in particular, we do not believe the actions being taken by ERDA to protect its shipments should govern whatever actions the NRC might subsequently direct regarding shipments of privately owned materials.

I should be pleased to inform you further on this matter should you so desire.

Sincerely,

Alfred D. Starbird

Alfred D. Starbird
Assistant Administrator
for National Security

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

November 11, 1976

Dr. Robert C. Seamans, Jr.
Administrator
Energy Research and Development
Administration
20 Massachusetts Avenue, N. W.
Washington, D. C. 20545

Dear Dr. Seamans:

On April 27 I requested that you provide ERDA's rationale for its decision to use the ERDA transportation system for ERDA owned special nuclear material. In his August 27 response, Mr. Starbird indicated that part of the basis for ERDA's decision was that the ERDA system would provide greater security than could be provided by commercial carriers.

The NRC Security Agency Study suggests the only basis for concluding that ERDA could provide better security than could appropriately regulated commercial carriers was the existence in some States of laws prohibiting possession of certain types of weapons. Mr. Starbird's response makes no mention of the ERDA decision being based on considerations of the nature of weapons permitted to guards. I would appreciate, therefore, your explaining the apparent discrepancy between the conclusion reached by the NRC in its Security Agency Study and that reached by ERDA.

Sincerely,

MK Udall

Morris K. Udall, Chairman
Subcommittee on Energy and
the Environment

XX. Laser Fusion

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

August 12, 1976

COPY

Dr. Robert C. Seamans
Administrator
Energy Research and Development Administration
Washington, D.C. 20545

Dear Dr. Seamans:

The possibility that the burgeoning technology of the laser may be applied to nuclear fusion for civil energy purposes has intrigued me ever since I became aware of the concept.

However, I do have some question as to whether this program, with its great potential for helping to satisfy our energy needs, should be managed as part of a program with military objectives. I believe that, if possible, the civil laser fusion program should be pursued as a civil program outside the strictures inherent in military related research and development. Should you decide that, the advantages of a civilian program not withstanding, there exist overwhelming reasons for developing laser fusion as a military program, I would appreciate your informing me as to the basis for such a decision.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy and the Environment

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

OCT 4 1976

Honorable Morris K. Udall
House of Representatives

Dear Mr. Udall:

I am pleased to respond to your letter dated August 12, 1976, inquiring about the relationship of the laser fusion program with the military program of ERDA.

At the present time the laser fusion program is in a research phase in which we are pursuing an ambitious but well structured program to demonstrate the feasibility of the laser fusion process. In doing so, we will be determining whether it is possible to produce a significant level of thermonuclear reactions in a target pellet. This demonstration is required before definitive plans for future applications can be made.

Responsibility for management of the program rests with the Division of Laser Fusion which was created on March 21, 1976, in recognition of the great potential offered by inertial confinement fusion for a variety of possible applications. The Division directs a broadly based program which includes laser, electron beam and heavy ion fusion concepts.

In such a research phase, the program cannot be considered to be either civilian or military in nature but rather it is a scientific program designed to increase our understanding of the physics of inertial confinement fusion. While it is true that there may be both civilian power and nuclear simulation applications for laser fusion, the near term emphasis of the program is not on any specific application but on developing the body of knowledge required for use in any eventual application.

As you are probably aware, a detailed study of the placement of the inertial confinement fusion program within ERDA was made at the request of the Congress and the results of the study were transmitted to the Joint Committee on Atomic Energy in January, 1976. After a thorough examination of the alternatives, the recommendation of the study was that the inertial confinement fusion program remain under the direction of the Assistant Administrator for National Security.

This recommendation was based on a consideration of several issues. It was felt that the key objective of any management arrangement for the program should be to ensure that the planned weapons applications and energy applications are each given the attention needed to achieve their goals. The classified aspects of the program coupled with the fact that the

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OCT 4 - 1976

facilities being built to demonstrate scientific feasibility can have near term weapons application, supported the recommendation that inertial confinement fusion remain in the National Security area of ERDA. This recommendation will be reviewed before the end of FY 1977 to determine if this management arrangement does, indeed, provide the optimum direction for the program.

In addition, a Laser Planning and Coordination Group (LPCG) was established to ensure coordination of the laser fusion program with the fusion program conducted by ERDA's Division of Magnetic Fusion Energy (MFE). The LPCG consists of the Assistant Administrator for Solar, Geothermal, and Advanced Energy Systems as Chairman and the Assistant Administrator for National Security. I directed that the LPCG have the following functions: ensure the early development of laser/e-beam fusion program plans that adequately provide for both military and civilian applications; monitor these programs to ensure that agreed upon plans are implemented to the extent appropriate to the research nature of the programs; be periodically briefed on the plans, technical progress, and budget projections for the laser program, as well as the MFE program; plan the laser fusion budget; and, finally, to provide a semiannual report to me on all LPCG functions.

It is also important to note that some of the most promising scientific theories and techniques currently being applied in the laser fusion program have had their origins in the nation's nuclear weapons development program at Los Alamos Scientific Laboratory, Los Alamos, New Mexico; Lawrence Livermore Laboratory, Livermore, California; and Sandia Laboratories in Albuquerque, New Mexico. It should also be recognized that these laboratories, which are involved in the laser fusion program, are also engaged in other energy research and development programs and not solely in nuclear weapons development. In addition, ERDA has contracts with KMSF, Inc., and the University of Rochester for work in the laser fusion program. Because some of the laser fusion concepts are related to those employed in certain aspects of weapons design, they are, of necessity, classified. We are continuing to utilize these concepts in the program because they represent the most expeditious means of developing laser fusion to meet both civilian and military objectives.

I greatly appreciate your interest in the laser fusion program and I would like to have Dr. C. Martin Stickley, the Director of the Division of Laser Fusion, discuss the program with you or your appropriate staff member in the near future. He will call your office for an appointment in a few days.

Sincerely,

Robert C. Seamans, Jr.
Administrator

XXI. Radioactive Waste Migration in Ground Water

NINETY-FOURTH CONGRESS

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COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

CHARLES CONKLIN
STAFF DIRECTOR
LEE MC ELVAIN
GENERAL COUNSEL
MICHAEL C. MARDEN
MINORITY COUNSEL

July 12, 1976

COPY

The Honorable
Robert C. Seamans, Jr., Administrator
Energy Research and Development Administration
20 Massachusetts Avenue, N.W.
Washington, D.C. 20545

Dear Dr. Seamans:

The July 4, 1976 New York Times contained the attached letter to the editor. This raises the general question of whether any radioactive wastes are buried in areas where there is any significant danger of migration of these into the ground water and from there into rivers. I would appreciate your indicating what ERDA believes the situation to be in regard to this matter.

Sincerely,

Morris K. Udall, Chairman
Subcommittee on Energy
and the Environment

Encl.

New York Times
July 4, 1976

Nuclear Waste Peril

To the Editor:

The recent flood at Teton Dam has raised once more the question of whether the radioactive wastes buried at the Idaho National Engineering Laboratory are likely to enter the Snake River aquifer.

This aquifer is one of the country's largest remaining reserves of pure fresh water, and directly above it is one of the world's largest burial grounds for plutonium-239 and other long-lived radioactive wastes. Plutonium waste from the nuclear weapons plant in Rocky Flats, Colo., is buried in Idaho; there was some controversy about this after the fire at Rocky Flats in 1969. The U.S. Geological Survey has detected radioactivity more than 100 feet below the disposal site.

If the flood waters have spread out into the ground beneath the laboratory, which is about twenty miles from the Snake River at Idaho Falls, there may be a pollution hazard. If this flood had occurred on the Big Lost River, which runs through the laboratory and is used for irrigation upstream, the radioactive pollution would have been tremendous.

It appears that the Atomic Energy Commission never anticipated massive flooding in the area, such as last week's flood, and that is why plutonium and other wastes were buried in the ground directly, up until 1970. It is high time that remedial action is taken.

CHARLES F. ZIMMERMANN
Ithaca, N.Y., June 15, 1976

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

AUG 5 1976

Honorable Morris K. Udall
House of Representatives

Dear Mr. Udall:

In your letter of July 12, 1976, to Dr. Seamans, you enclosed a copy of a letter To The Editor from the July 4 issue of the New York Times. The author of that letter noted the recent Teton Dam flood and asked if the radioactive wastes buried at our Idaho National Engineering Laboratories (INEL) are likely to enter the Snake River Plain Aquifer. You, in turn, asked if there is a significant danger of migration of radioactive waste buried at the Energy Research and Development Administration's (ERDA) sites.

Let's first examine that letter To The Editor:

The Snake River comes no closer than 40 miles to the facility where the plutonium-contaminated wastes are stored. The recent flooding that resulted from the failure of Teton Dam has not and is not expected to cause any adverse effect on any activities conducted at the INEL, including the radioactive wastes. According to the United States Geological Survey (USGS), the recharge of groundwater from the flood is expected to result in a rise of one foot or less in the water level of the Snake River Plain Aquifer which is about 580 feet below the land surface of the radioactive waste storage area.

A flood control system has been constructed on the INEL that provides protection from a flood on the Lost River having a probability of occurrence of once in 55 years. Another system protects the waste disposal area from localized flooding as occasionally occurs during spring runoff. Modifications to protect the INEL from a 300-year return flood have been identified and another study is contemplated to study the hypothetical effect of a maximum flood of the Lost River and the simultaneous failure of the Mackay Dam Reservoir on the Lost River. The Mackay Reservoir, which is located about 36 miles from the nearest INEL boundary has a storage capacity of less than 20 percent of the water released from the Teton Dam failure.

Where waste materials have been detected beneath the disposal site, most samples showed amounts of radioactivity less than is found in surface soils in various parts of the United States. These very low levels of radioactivity are detectable only with the most sensitive analytical equipment and techniques. If wastes were to migrate to the aquifer, dispersion, dilution, and ion exchange would further reduce the concentrations and retard the migrations of the wastes within the aquifer.

You may be interested in learning that ERDA made all of the INEL rescue and heavy equipment and expertise available to local governmental agencies during and following the Teton Dam disaster. In addition, thousands of the INEL employees and their families voluntarily spent and are continuing to spend countless hours assisting those directly affected by the Teton Dam catastrophe.

As to the general situation, we do not consider that there is a significant danger of migration of radioactive waste buried at ERDA sites. Safety analyses have been developed at each of our sites which, among other things, examine the impact of flooding on waste buried there. Each new major project contemplated at those sites caused the development of an environmental impact statement (EIS) which considers the possibility of flooding. As you know, those latter statements are reviewed by Federal, state, and local agencies including the Nuclear Regulatory Commission (NRC), USGS, the Environmental Protection Agency (EPA), and their state level counterparts. While we perceive no significant danger of radioactive waste migration, we wish to assure you that we are maintaining our vigilance, and continuously attempting to upgrade our waste management practices.

We hope that the information provided is responsive to your concerns. If we can be of further assistance to you, please let us know.

Sincerely,

F. P. Baranowski, Director
Division of Nuclear Fuel
Cycle and Production

On May 14, 1976, Subcommittee Chairman Udall submitted a series of questions to ERDA on the matter of an ERDA pamphlet, Shedding Light on the Facts about Nuclear Power. Mr. Udall's letter and ERDA's response dated June 4, 1976 are included in the record of the Subcommittee's May 6, 1976 hearing, Oversight on ERDA's Use of "Shedding Light" Pamphlet. A copy of the hearing record may be obtained from the Subcommittee.